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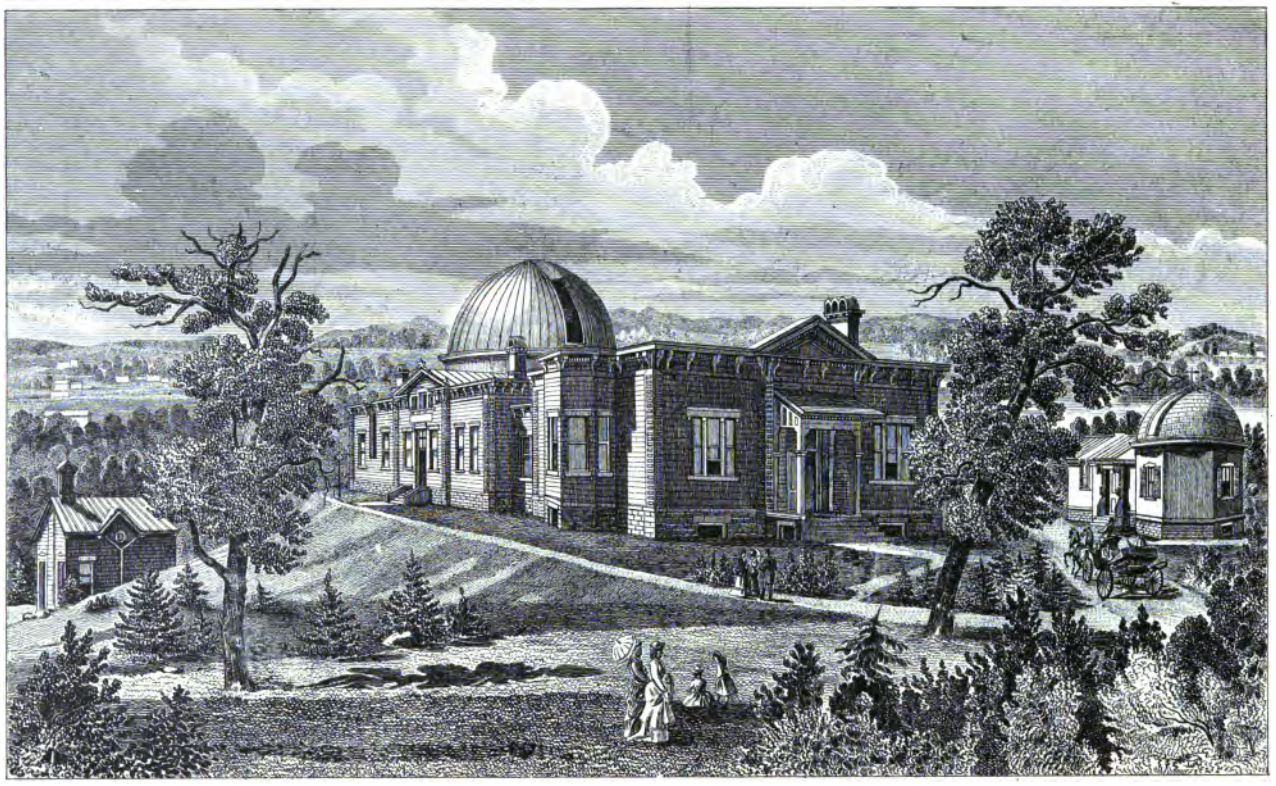

WASHBURN OBSERVATORY.

PUBLICATIONS

OF THE

WASHBURN OBSERVATORY

OF THE

UNIVERSITY OF WISCONSIN.

VOL. V.

MADISON, WISCONSIN:
DEMOCRAT PRINTING COMPANY, STATE PRINTERS.
1887.

WASHBURN OBSERVATORY.

FOUNDED BY

CADWALLADER C. WASHBURN.

BORN 1818; DIED 1882.

JOHN E. DAVIES,	PROFESSOR IN CHARGE.
MILTON UPDEGRAFF, ALICE M. LAMB,	ASSISTANT ASTRONOMERS.
JAMES LEWIS CAREY, (Student),	METEOROLOGICAL OBSERVER.
JOHN DOESCHER,	JANITOR.

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HON. GEO. H. PAUL,	*President of the Board of Regents of the University of Wisconsin.*
PROF. JOHN E. DAVIES,	*In Charge of the Observatory.*

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WASHBURN OBSERVATORY.

I. INTRODUCTION.

The work of the observatory during the past year has been prosecuted under peculiar difficulties. Owing to a variety of circumstances connected with a prospective change in the administration of the University, no Director was appointed to succeed Prof. E. S. HOLDEN, on his resignation, in the winter of 1885, to assume the directorship of the Lick Observatory, and the presidency of the University of California. The two assistants, Mr. UPDEGRAFF and Miss LAMB, were left to go on with the work of completing the observations and reductions necessary for the 303 star list undertaken and nearly completed by PROF. HOLDEN, for the *Astronomische Gesellschaft*, and the final proof-reading and bringing out of Vol. IV, of the "Publications" of the observatory.

They were occupied with this work and the distribution of the printed volumes until well along into the spring of 1886. After the completion of the 303 star list the assistants in charge of the observatory proceeded, in connection with observations of Polaris for latitude, to investigate the errors of those diameters of the Repsold meridian circle, which were used in observations of Polaris and the nadir point. The results of all the work done in this direction will be found in its proper place in this volume.

On my return from Europe in June, 1886, I offered to take general charge of the observatory, until a permanent Director should be appointed or until the arrival of the new President of the University. It was understood that I should be required to give it only such time and general attention as were compatible with the efficient discharge of my duties as professor of Physics in the University. This offer was

accepted, and I assumed control of the observatory and general direction of the work of the assistants on July 1, 1886.

The study of the division errors of the meridian circle was continued, observations upon Polaris for latitude were regularly kept up, and when opportunity offered, observations were made for horizontal flexure and the other instrumental constants.

The 15-inch equatorial which for some time had been only occasionally used, save upon public evenings, was overhauled, the work of the driving clock improved, new counterpoise weights provided, and micrometer observations begun upon double stars with the excellent filar micrometer formerly used by Mr. S. W. BURNHAM and Prof. HOLDEN.

For this purpose I consulted with Mr. BURNHAM upon what work, in his opinion, was most needed to be done in this direction, and here desire to express to him my thanks for his counsel and suggestions.

My personal share in this work was seriously interrupted by the time necessarily devoted during the summer to the superintendence of the triangulation of the state, prosecuted every summer since 1874, and by subsequent illness. Nevertheless, a fair number of results were obtained, all of which are printed in the present volume. And here it may be proper to remark that the past winter was one of unprecedented cloudiness at Madison, as the meteorological observations show, interfering very seriously with all plans for consecutive observing.

During the months of November and December a list of stars was observed on the meridian circle in declination for a determination of the latitude, by Mr. UPDEGRAFF and Miss LAMB.

About the first of January, 1887, I was requested to aid in securing a series of observations of the planet Sappho (80) near opposition, for the use of Mr. ROBERT BRYANT, of the Royal Astronomical Society. Unfortunate weather interfered with these observations until the 14th of January, after which observations were obtained on six different nights, when another long interval of difficult weather rendered

further observation near the time of opposition impossible. These observations were transmitted, when reduced, to Mr. BRYANT, Royal Astronomical Society, Burlington House, London, who in acknowledging them says: "Your nine observations will be of the greatest service to me. One point noticeable in them is your continued use, when possible, of the same comparison star. It is then worth while to get 4 or 6 observations of that star made at a large observatory. I wish other observers would carry out this idea as well as yourself."

It was intended to have equal sets of measurements by Mr. UPDEGRAFF and myself upon each observing night. But clouds interfered on January 25th, and the observation of the 17th was obtained during a sudden clearing up of the sky after a violent storm. This was taken advantage of by Mr. UPDEGRAFF, who resides in the observatory building.

After the completion of the observations upon Sappho, work was carried on by myself with the large equatorial while Mr. UPDEGRAFF and Miss LAMB took up the observation in declination of another list of stars with the meridian circle. These latter observations together with those made during November and December were undertaken with a view of determining the latitude and instrumental errors in declination according to a plan of Mr. UPDEGRAFF'S. By grouping the stars in pairs having as far as possible equal zenith distances north and south, and combining the results of each group in both positions of the circle, it is clear that the effect of instrumental errors are reduced to a minimum. This method of obtaining the latitude will give, it is believed, the best results thus far attainable from the meridian circle, especially if there still be added, as is intended, a new list of stars comprised within zenith distances 40°—60° north and 40°—60° south, two zones heretofore lacking in stars observed here for this purpose.

Attention is called to the careful discussion found in the volume of all the results thus far available and the latitude value resulting therefrom.

In this connection I cannot avoid referring to the desira-

bility of determining the so-called station-error of the site of the observatory. The triangulation already executed in the state of Wisconsin by the U. S. Coast and Geodetic Survey furnishes the means for carrying forward several well determined latitudes from surrounding trigonometrical stations to the observatory. The latitude of these stations might, if thought desirable, be redetermined with extra care and improved instruments provided by the survey for this especial purpose. The accuracy of the geodetical methods of carrying forward a latitude or longitude is so well known and the attention recently given to local deflections of the plumb line so considerable in all prominent geodetic surveys, that it seems highly desirable that the most exact reductions of the latitude for this place should be determined, taking into account local variation of the ordinary or geographical latitude as well.

Immediately on assuming charge of the observatory, I opened negotiations with the Chicago and Northwestern Railway and some of the other railway companies entering Madison with a view to the extension of the time service of the observatory. This has resulted in the adoption of such service by two additional companies — the Chicago and Northwestern and the Milwaukee, Lake Shore and Western —with a fair prospect that the observatory may hereafter be the chief center for the distribution of time in the northwest. It now has the Chicago, Milwaukee and St. Paul, the Central Iowa, the Wisconsin Central, and the two roads above named. It is believed that any other railroads hereafter entering Madison will find it to their advantage to receive their time in the same way.

A summary of the observing work done from last August up to the date of printing (April 1st, 1887,) is as follows:

MERIDIAN CIRCLE.

Observations of fundamental stars for determination of the Latitude and discussion of errors of instrument and Refraction	452
Observations of other stars for Refraction	84
Observations of Polaris for Latitude	83
Total number of observations	619

There have been made:

Determinations of the azimuth	112
Determinations of the level	114
Determinations of the collimation	24
Determinations of the nadir point	264
Determinations of the horizontal flexure	60

LARGE EQUATORIAL.

Double Star measures	170
Observations of Sappho (80), (comparisons on 6 nights)	9
Observations of Comet *b*, 1887, (BROOKS), (comparisons on 3 nights)	3
Total number of observations	182

Two determinations of the constants of the equatorial have been made, the results of which will be found in their proper place.

The office work has consisted in all the necessary computations for the reduction of latitude observations, determinations of time, instrumental constants, orbits of comets and double stars, positions of Sappho (80) and a careful discussion of the clock rates for the HOHWÜ sidereal and HOWARD mean time clocks, the results of which will be published hereafter.

An index of stars in the Greenwich Catalogues not found in FLAMSTEED has been prepared by Miss LAMB. This index forms a considerable part of the present volume and is thoroughly explained in Miss LAMB's preliminary remarks to the same.

The meteorological observations have been faithfully made and reduced by Mr. J. L. CAREY, a student in the university. They are printed at the end of the volume.

April 15, 1887.

JOHN E. DAVIES,
Professor in Charge of the Observatory.

II. THE CLOCKS AND SMALLER INSTRUMENTS.

THE SIDEREAL CLOCK, HOHWÜ, NO. 32.

The sidereal clock was dismounted and cleaned on Oct. 31st, 1884. Until Aug. 3d, 1885, the weight was wound up daily instead of once a week, as usual. This change in the winding does not seem to have disturbed the rate. No other change has been made which could have any effect on the rate. A thermometer in the clock case is read daily at 7 A. M.

The average daily rates for the years 1885 and 1886, are very nearly the same. For 1885 the mean daily rate, reduced to a barometric pressure of 30 in., was $-0^s.86$, with a mean temperature inside the clock case of 65° Fahr. For 1886 the rate was $-0^s.81$, with a temperature of 68° Fahr. However, the rate varies considerably during the year, as may be seen by inspection of the tables below.

While the temperature of the clock case is kept between 68° and 80° Fahr., the running of the clock is excellent, but for temperatures below 68°, the rate decreases rapidly with the temperature and is more irregular. Certain defects in the mounting of this clock spoken of in Vol. II., *Publications of the Washburn Observatory*, may have some influence on the rate.

A discussion of the rates has been made for the years 1885 and 1886, separately. The observed rates were first corrected for variation of the barometer by the formula

$$R_0 = R + 0^s.30\ (30 - \beta)$$

in which R is the observed rate, and R_0 the rate at a barometic pressure of 30 inches. The means of the rates (reduced for barometer), with the corresponding mean temperatures were taken for each month and formulae derived for each of the years 1885 and 1886 separately. First, the general formula

$$R_0 = R_1 + \alpha\ (t - 60)$$

was assumed in which R_0 = the rate at $\beta = 30$ in. and R_1 = rate at $\beta = 30$ in. and $t = 60°$. An equation was formed for each month and the values of the quantities R_1 and a derived for each year by the method of least squares.

Then the formula

$$R_0 = R_1 + a(t - 60) + b(t - 60)^2$$

was assumed and the quantities R_1, a and b deduced as before. The results are as follows:

For 1885—

$R_0 = -0^s.562 - 0^s.0608\,(t - 60)$ - - - - - I.

$R_0 = -0^s.678 - 0^s.0591\,(t - 60) + 0^s.00213\,(t - 60)^2$ - - II.

For 1886—

$R_0 = -0^s.505 - 0^s.0412\,(t - 60)$ - - - - - III.

$R_0 = -0^s.406 - 0^s.0869\,(t - 60) + 0^s.00288\,(t - 60)^2$ - IV.

In the following table the mean rates (reduced for barometer) are given with the corresponding temperatures and the rates at these temperatures computed by the above formulae. It will be noticed that formulae II and IV, satisfy the actual rates of the clock rather better than formulae I and III.

MEAN DAILY RATES FOR EACH MONTH OF THE YEARS 1885 AND 1886.

1885.	Temp. in Clock Case.	Observed Rate $+0^s.30\ (30-\beta)$.	Rate Computed from Formula I.	Rate Computed from Formula II.
	°	s	s	s
January	56	−0.38	−0.32	−0.41
February	56	−0.43	−0.32	−0.41
March	62	−0.78	−0.68	−0.79
April	63	−0.93	−0.74	−0.84
May	65	−1.06	−0.86	−0.93
June	71	−1.09	−1.23	−1.07
July	74	−1.08	−1.41	−1.09
August	70	−1.06	−1.17	−1.06
September	66	−1.01	−0.92	−0.95
October	66	−0.96	−0.92	−0.95
November	65	−0.81	−0.86	−0.93
December	65	−0.74	−0.86	−0.93
Means	64°.9	$-0^s.86$	.....	.....

1886.	Temp. in Clock Case.	Observed Rate $+0^s.30\ (30-\beta)$.	Rate Computed from Formula III.	Rate Computed from Formula IV.
	°	s	s	s
January	60	−0.46	−0.50	−0.41
February	60	−0.44	−0.50	−0.41
March	64	−0.66	−0.66	−0.71
April	65	−0.89	−0.71	−0.77
May	66	−1.00	−0.75	−0.83
June	71	−1.00	−0.95	−1.02
July	75	−0.98	−1.12	−1.06
August	76	−1.13	−1.16	−1.06
September	73	−1.03	−1.04	−1.05
October	71	−1.01	−0.95	−1.03
November	66	−0.79	−0.75	−0.83
December	63	−0.38	−0.62	−0.64
Means	67°.5	$-0^s.81$	.....	.....

THE MEAN TIME CLOCKS, HOWARD NO. 221 AND HOWARD NO. 306.

The Mean Time clock HOWARD No. 221, was cleaned by E. HOWARD & Co., the makers, in December, 1885. Its running since that time has been excellent and the electric contact apparatus has worked well.

Howard No. 306, was mounted in November, 1885. This clock has DENISON'S "Gravity Escapement" and is apparently a very fine piece of mechanism. It has been found to have a large temperature coefficient and an estimation of its time-keeping properties can not well be made until the compensation has been adjusted. This is now being done.

The electric contact in this clock works rather better than that in HOWARD No. 221. At the suggestion of Dr. DAVIES an "electrical accumulator" has been applied to this clock with the effect of obliterating the extra spark at the platinum contact and preventing too rapid wear of the platinum. This is found to improve the quality of the time signals.

THE SMALL EQUATORIAL.

The small equatorial has been cleaned and the counterpoising adjusted. It has been used for the purpose of instruction.

THE FAUTH TRANSIT.

In February, 1886, the diaphragm for regulating the length of the bubble in the striding level of the Fauth Transit (see page 107, *Pub. Wash. Obs.*, vol. III.) became displaced and the level-tube was sent to FAUTH & Co. for repairs. They returned a new level-tube and reported the value of 1 division to be 2.″2. A determination of the value of 1 division of this level by Mr. UPDEGRAFF, on May 27–28–29, 1886, gives

$$1 \text{ div.} = 2.''21 \pm 0.''012.$$

In January, 1886, the micrometer thread was broken. It was replaced and the focus of the instrument was disturbed in the operation. The value of 1 rev. of the micrometer screw should be redetermined.

III. RECORD OF THE CONSTANTS OF THE MERIDIAN CIRCLE FROM 1886, JANUARY 1, TO 1887, APRIL 1.

POSITION OF THE CIRCLE.

The Circle was West:

From 1886, Mar. 15, to 1886, July 29.
Oct. 6, Nov. 1.
Dec. 6, 1887, Feb. 16.

The Circle was East:

From 1885, Dec. 19, to 1886, Mar. 15.
1886, July 29, Oct. 6.
Nov. 1, Dec. 6.
1887, Feb. 16.

RECORD OF NADIR POINTS FROM 1886 JAN 1, TO 1887 APRIL 1.

Date.	Sid. Time.	Circle.	Temp.	Obsr.	Nadir Point.	Remarks.
1886.	h.		°		° ′ ″	
Jan. 1	.....	E.	.....	.....	.....	
Mar. 15	4.0	W.	.....	L.	125 27 23.32	Reversed Circle
Apr. 4	0.7	W.	35	U.	27 19.33	
5	1.5	W.	38	U.	27 19.15	
7	0.8	W.	45	U.	27 8.12	
8	1.5	W.	47	U.	27 8.16	
16	0.8	W.	59	U.	26 51.60	
16	1.8	W.	64	U.	26 51.28	
18	0.9	W.	64	L.	26 49.59	
18	1.7	W.	68	L.	26 49.61	
19	0.8	W.	64	L.	26 49.11	
21	0.9	W.	68	L.	26 49.55	
21	1.6	W.	70	L.	26 49.44	
29	1.0	W.	54	L.	26 40.22	
29	1.5	W.	57	L.	26 40.18	
May 6	0.9	W.	52	L.	26 41.26	
6	1.7	W.	56	L.	26 41.56	
7	0.8	W.	59	L.	26 30.61	
15	0.8	W.	51	U.	26 32.75	
15	1.6	W.	51	U.	26 32.53	
16	0.9	W.	54	L.	26 32.78	
16	1.4	W.	55	L.	26 32.13	
18	13.0	W.	.....	U.	26 31.44	
18	0.8	W.	60	L.	26 30.48	
18	1.5	W.	63	L.	26 30.59	
19	0.8	W.	60	L.	26 22.60	
19	1.6	W.	63	L.	26 23.00	
21	Position of microscopes changed.					
21	0.9	W.	69	L.	27 43.33	

RECORD OF NADIR POINTS—Continued.

Date.	Sid. Time.	Circle.	Temp.	Obsr.	Nadir Points.	Remarks.
1886.	h.		°		° ′ ″	
May 21	1.6	W.	70	L.	125 27 43.81	
23	0.9	W.	67	L.	27 44.17	
23	1.7	W.	66	L.	27 43.95	
24	0.8	W.	64	L.	27 44.38	
24	1.8	W.	66	L.	27 44.68	
25	0.9	W.	62	L.	27 44.66	
25	1.5	W.	64	L.	27 44.98	End of Book D.
27	0.9	W.	65	U.	27 44.96	
27	1.5	W.	66	U.	27 45.30	
29	12.9	W.	71	U.	27 46.49	
29	13.5	W.	72	U.	27 46.37	
30	0.9	W.	65	U.	27 46.26	
30	1.6	W.	66	U.	27 46.37	
June 3	13.0	W.	.....	U.	27 45.39	
3	13.5	W.	.....	U.	27 45.69	
7	12.8	W.	65	U.	27 46.00	
July 26	12.9	W.	80	L.	27 58.37	
26	13.6	W.	82	L.	27 58.45	
29	.....	.....	.....	.....	.....	Circle reversed.
Aug. 1	12.9	E.	79	U.	33 6.42	
2	13.0	E.	74	L.	33 6.23	
2	13.6	E.	74	L.	33 6.80	
7	13.0	E.	78	U.	33 5.51	
7	13.6	E.	77	U.	33 5.41	
9	12.9	E.	87	L.	33 5.69	
10	12.9	E.	83	L.	33 6.54	
10	13.6	E.	84	L.	33 6.20	
18	13.0	E.	83	L.	33 6.59	
19	12.8	E.	79	L.	33 6.75	

RECORD OF NADIR POINTS — Continued.

Date.	Sid Time.	Circle.	Temp.	Obsr.	Nadir Points.	Remarks.
1886.	h.		°		° ′ ″	
24	13.0	E.	80	U.	33 4.61	
Aug. 24	13.6	E.	81	U.	125 33 4.93	Very poor.
25	12.9	E.	79	U.	33 5.15	
25	13.6	E.	80	U.	33 4.97	Very poor.
26	12.8	E.	85	U.	33 4.22	
26	13.6	E.	84	U.	33 4.19	
30	12.9	E.	69	L.	33 5.51	
30	13.6	E.	69	L.	33 5.55	
31	12.9	E.	65	L.	33 5.05	
31	13.6	E.	66	L.	33 5.14	
Sept. 4	12.9	E.	79	L	33 5.32	
4	13.6	E.	80	L.	33 4.98	
6	12.8	E.	84	L.	33 4.07	
6	13.6	E.	84	L.	33 4.10	
7	12.9	E.	85	L.	33 5.15	
7	13.6	E.	85	L.	33 5.18	
10	12.9	E.	68	L.	33 4.98	Trains passing. Very poor.
10	13.6	E.	70	L.	33 5.81	
14	12.9	E.	66	U.	33 8.35	
14	13.6	E.	66	U.	33 7.92	
15	12.9	E.	71	U.	33 6.57	
15	13.6	E.	72	U.	33 6.57	
17	12.9	E.	64	U.	33 5.84	
23	12.9	E.	73	U.	33 4.10	
23	13.7	E.	73	U.	33 4.13	
28	12.8	E.	60	L.	33 15.81	Sun shone on east alidade and pier before observation.
28	13.6	E.	60	L.	33 8.72	
Oct. 1	12.8	E.	48	L.	33 7.57	
2	12.8	E.	55	L.	33 7.49	
2	13.6	E.	58	L.	33 7.62	

RECORD OF NADIR POINTS—Continued.

Date.	Sid. Time.	Circle.	Temp.	Obsr.	Nadir Points.	Remarks.
1886.	h.		°		° ′ ″	
Oct. 4	12.8	E.	64	L.	125 33 6.38	
4	13.6	E.	66	L.	33 6.50	
5	12.9	E.	62	L.	33 5.29	
5	13.6	E.	64	L.	33 5.74	
5	12.9	E.	64	L.	33 5.82	
6	13.6	E.	66	L.	33 5.71	
6	.....	.....	.....	.....	.....	Circle reversed.
6	12.8	W.	70	L.	125 27 57.38	
7	12.9	W.	71	L.	28 3.09	
8	13.6	W.	73	L.	28 3.67	
9	16.0	W.	Dec. Mic. wires made horizontal.			
9	12.9	W.	74	U.	125 28 8.27	Same civil date.*
10	13.6	W.	75	U.	28 5.85	
12	13.0	W.	Eye-end removed new Dec. Mic. wires put in.			
14	12.9	W.	55	L.	125 30 2.76	
14	13.7	W.	55	L.	30 5.69	
17	12.9	W.	53	L.	30 6.15	
17	13.6	W.	55	L.	30 7.12	
18	12.9	W.	62	U.	30 6.12	
18	13.6	W.	64	U.	30 6.07	
19	12.9	W.	67	L.	30 4.57	
20	12.9	W.	60	L.	30 6.01	
20	13.6	W.	61	L.	30 6.00	
21	12.9	W.	62	L.	30 6.62	
21	13.6	W.	64	L.	30 6.92	
26	1.1	W.	45	U.	30 6.91	
26	1.6	W.	44	U.	30 6.41	
26	12.9	W.	42	L.	30 6.04	

*On investigation found that declination micrometer wires did not move freely.

RECORD OF NADIR POINTS—Continued.

Date.	Sid. Time.	Circle.	Temp.	Obsr.	Nadir Point.	Remarks.
1886.	h.		°		° ′ ″	
Oct. 26	13.6	W.	44	L.	125 30 6.18	
27	0.9	W.	44	L.	30 6.10	
27	1.5	W.	44	L.	30 6.58	
27	12.9	W.	45	L.	30 5.82	
27	13.6	W.	47	L.	30 5.83	
28	1.0	W.	46	L.	30 6.24	
28	1.6	W.	47	L.	30 6.70	
28	13.0	W.	48	U.	30 6.70	
28	13.6	W.	50	U.	30 6.42	
29	1.0	W.	49	U.	30 7.28	
29	1.6	W.	50	U.	30 7.26	
29	13.0	W.	54	U.	30 6.42	
29	13.6	W.	56	U.	30 6.41	
30	0.9	W.	50	U.	30 6.78	
30	1.6	W.	51	U.	30 6.88	
30	13.0	W.	55	U.	30 6.71	
30	13.6	W.	57	U.	30 6.76	
31	13.0	W.	58	U.	30 6.84	
Nov. 2	.....	.....	.....	.....	.....	Circle reversed.
2	13.0	E.	53	U.	35 10.26	
2	13.6	E.	52	U.	35 10.67	
3	1.2	E.	48	U.	35 10.94	
3	1.5	E.	47	U.	35 10.92	
4	1.2	E.	53	U.	35 11.86	
4	1.5	E.	53	U.	35 11.72	
5	13.1	E.	36	U.	35 14.00	
5	13.5	E.	38	U.	35 14.07	
6	1.1	E.	31.5	L.	35 13.61	
6	1.5	E.	32	L.	35 13.62	
6	13.2	E.	32	U.	35 15.00	

RECORD OF NADIR POINTS—Continued.

Date.	Sid. Time.	Circle.	Temp.	Obsr.	Nadir Point.	Remarks.
1886	h.		°		° ′ ″	
Nov. 7	1.0	E.	30	U.	125 35 13.94	
7	1.5	E.	31	U.	35 14.08	
7	13.0	E.	32	L.	35 14.53	
7	13.5	E.	35	L.	35 15.01	
8	1.1	E.	40	L.	35 14.12	
8	1.5	E.	41	L.	35 13.79	
10	13.1	E.	34	L.	35 10.78	
10	13.5	E.	35.5	L.	35 11.16	
11	1.1	E.	34	L.	35 11.31	
11	1.5	E.	34	L.	35 11.27	
11	13.1	E.	32	L.	35 11.43	
11	13.5	E.	33	L.	35 11.37	
12	1.0	E.	33	U.	35 10.77	
12	1.5	E.	33	U.	35 10.83	
12	12.1	E.	—	L.	35 11.55	
12	13.5	E.	33.5	L.	35 11.61	
13	1.0	E.	35	L.	35 10.73	
13	1.5	E.	34	L.	35 10.58	
13	13.1	E.	37	U.	35 11.15	
13	13.5	E.	38	U.	35 10.56	
14	13.1	E.	35	L.	35 10.07	Very poor.
14	13.5	E.	36	L.	35 10.26	
15	1.1	E.	36	L.	35 9.81	
15	1.5	E.	36	L.	35 9.97	
17	14.0	Index of Z. D. mic. taken off and readjusted.				
17	15.0	E	29	U.	34 4.91	
18	13.0	E.	22	L.	34 6.63	
18	13.5	E.	25	L.	34 7.05	
19	13.1	E.	32	L.	34 4.60	

RECORD OF NADIR POINTS — Continued.

Date.	Sid. Time.	Circle.	Temp.	Obsr.	Nadir Points.	Remarks.
1885.	h.		°		° ′ ″	
Nov. 19	13.5	E.	33	L.	125 34 4.70	
21	1.2	E.	38	U.	34 4.26	
21	1.5	E.	38	U.	34 4.31	
22	13.1	E.	29	L.	34 2.48	
25	13.0	E.	18	L.	34 7.27	
26	22.2	E.	23	U.	34 6.99	
26	23 3	E.	23	U.	34 6.77	
26	0.3	E.	22	U.	34 6.56	
26	1.0	E.	24	U.	34 6.64	
26	1.5	E.	24	U.	34 6.91	
28	13.0	E.	18	L.	34 3.07	
28	13.6	E.	18	L.	34 3.83	
30	13.5	E.	6	L.	34 5.34	
Dec. 3	22.5	E.	10	U.	34 5.28	
3	23.3	E.	9	U.	34 5.43	
3	0.4	E.	8	U.	34 4.81	Very poor.
	1.0	E.	8	U.	34 5.88	
4	21.2	E.	15	U.	34 7.59	
4	22.1	E.	12	U.	34 6.25	
4	23.4	E.	11	U.	34 5.98	
4	0.3	E.	11	U.	34 5.80	
4	1.0	E.	10	U.	34 5.89	
4	1.1	E.	10	L.	34 5.69	
4	1.5	E.	12	L.	34 4.76	
6	21.2	E.	25	U.	34 5.48	
6	22.1	E.	25	U.	34 4.82	
6	23.3	E.	24	U.	34 3.94	
6	0.3	E.	22	U.	34 3.36	
6	1.0	E.	22	U.	34 2.98	

RECORD OF NADIR POINTS — Continued.

Date.	Sid. Time.	Circle.	Temp.	Obsr.	Nadir Point.	Remarks.
1886.	h.		°		° ′ ″	
Dec. 6	1.1	E.	21	L.	125 34 2.88	
6	1.5	E.	24	L.	34 2.81	
6	15.0	Circle	Reversed. Microscopes Adjusted.			
7	21.2	W.	32	U.	125 29 0.64	
7	22.2	W.	29	U.	29 0·12	
7	23.4	W.	27	U.	29 0.33	
8	21.2	W.	34	U.	28 59.01	
8	22.0	W.	32	U.	28 59.71	Poor.
8	23.3	W.	31	U.	28 59.66	
8	0.3	W.	31	U.	28 59.35	
8	1.0	W.	30	U.	28 59.49	
8	1.1	W.	30	L.	28 59.22	
8	1.5	W.	30	L.	28 59.32	
9	23.1	W.	41	U.	29 3.56	Poor.
9	23.5	W.	40	U.	29 3.51	Poor.
9	0.4	W.	40	U.	29 3.36	Poor.
9	1.1	W.	40	U.	29 3.20	Poor.
14	13.0	W.	+9	U.	28 59.82	
14	13.5	W.	+8	U.	29 0.15	
15	13.1	W.	0.0	U.	29 0.85	
15	13.6	W.	+3	U.	29 1.05	
19	1.1	W.	+16	U.	28 59.74	
20	0.4	W.	+29	U.	29 1.46	
20	1.0	W.	+29	U.	29 1.60	
20	1.1	W.	+29	L.	29 1.70	
20	1.5	W.	+29	L.	29 1.06	
21	1.1	W.	+18	L.	28 56.85	
21	1.4	W.	+18.5	L.	28 58.26	Very poor.
21	1.5	W.	+18	U.	28 59.33	Very poor.

RECORD OF NADIR POINTS—Continued.

Date.	Sid. Time.	Circle.	Temp.	Obsr.	Nadir Point.	Remarks.
1886.	h.		°		° ′ ″	
Dec. 21	2.2	W.	17	U.	125 28 59.54	
21	3.4	W.	17	U.	28 59.51	
22	1.5	W.	17	U.	29 0.01	
22	2.2	W.	16	U.	28 59.72	
22	3.5	W.	16	U.	28 59.59	
1887.						
Feb. 8	1.0	W.	28	L.	29 4.47	
8	1.5	W.	28	L.	29 4.49	
8	4.7	W.	21	U.	29 5.64	
8	5.3	W.	22	U.	29 5.61	
8	6.0	W.	22	U.	29 5 44	
8	7.1	W.	22	U.	29 6.68	
8	20.0	.....	.....	.....	.....	*See note below
9	4.7	W.	31	U.	28 2.50	Poor.
9	5.2	W.	31	U.	28 2.38	
9	6.0	W.	30	U.	28 3.19	Very poor.
15	4.7	W.	25	U.	28 1.46	Good.
15	5.2	W.	26	U.	28 1.60	
15	5.9	W.	26	U.	28 1.63	
15	7.0	W.	23	U.	28 1.83	
16	1.1	W.	36	U.	28 1.40	Good.
16	1.5	W.	34	U.	28 1.38	Good.
16	4.6	W.	32	U.	28 1.17	
16	5.2	W.	30	U.	28 2.17	Microscopes discordant.
16	5.9	W.	30	U.	28 1 83	
16	7.0	W.	27	U.	28 1.77	
16	7.6	W.	28	U.	28 1.09	

*Wire nearest micrometer head found to be loose and taken out. The wire farthest from the micrometer head seems to be in good condition and will be used hereafter. Position of micrometer zero changed.

RECORD OF NADIR POINTS — Continued.

Date.	Sid. Time.	Circle.	Temp.	Obsr.	Nadir Point.	Remarks.
1887.	h		°		° ′ ″	
Feb. 16	22.	.....	.....	.....	.....	Circle reversed.
28	4.6	E.	30	U.	125 32 53.20	Very poor.
28	5.2	E.	33	U.	32 53.75	Very poor.
28	6.0	E.	33	U.	32 53.02	
28	7.1	E.	34	U.	32 52.24	
28	7.7	E.	34	U.	32 51.67	Good.
Mar. 1	4.7	E.	43	U.	32 49.05	Good.
1	5.3	E.	43	U.	32 48.68	Good.
1	6.0	E.	42	U.	32 48.74	
1	7.1	E.	42	U.	32 48.47	
1	7.6	E.	42	U.	32 48.37	
10	5.9	E.	36	U.	32 49.55	Good.
10	7.0	E.	33	U.	32 48.86	Good.
10	7.6	E.	34	U.	32 49.09	Good.

RECORD OF CONSTANTS FROM 1886, JANUARY 1, TO 1887, APRIL 1.

N. B.—The column *c* gives the setting of the R. A. Micrometer for *c*=0. The values of *a* have been derived from time observations

Date.	Sid. Hour.	*a*.	*b*.	*c*.	Reading of N. C. on S. C.	*c* from Nadir.	Circle.	Observer.	Remarks.
1886.		s.	s.						
Jan. 1	.....	.....	.....	.....	.....	.....	E.	.....	
5	0.7	−0.30	−0.57	.....	.....	.....	E.	U.	
9	6.0	+0.73	+0.03	.....	.....	.....	E.	U.	
11	2.0	+0.36	−0.22	.....	.....	.....	E.	U.	Temp.–12
13	22.6	.....	.....	.392	.767	.....	E.	U.	
13	2.3	−0.04	−0.74	.....	.....	.....	E.	U.	
16	1.0	+0.08	−0.69	.....	.....	.....	E.	U.	
19	1.7	+0.08	−0.158	.....	.....	.....	E.	L.	
22	1.5	−0.25	+0.137	.....	.....	.....	E.	L.	
25	2.0	−0.41	−0.543	.....	.....	.....	E.	L.	
26	20.0	.....	.....	.391	.836	.....	E.	L.	
29	2.0	−0.53	−0.157	.....	.....	.....	E.	L.	
Feb. 1	7.0	−0.47	+0.127	.....	.....	.....	E.	U.	
4	2.8	−0.23	+0.152	.....	.....	.....	E.	U.	
6	3.0	−0.26	−0.238	.398	.834	.....	E.	U.	
7	2.8	−0.42	−0.427	.....	.....	.....	E.	U.	
9	8.3	−0.32	−0.199	.....	.....	.....	E.	U.	
15	3.4	−0.24	+0.293	.....	.....	.....	E.	L.	
16	6.1	−0.30	+0.506	.....	.....	.....	E.	B.	
19	6.7	−0.40	+0.225	.....	.....	.....	E.	B.	
21	3.4	.....	+0.100	.....	.....	.....	E.	L.	
22	3.9	−0.40	+0.083	.....	.....	.....	E.	L.	
23	21.0	.....	.....	.398	.807	.....	E.	L.	
Mar. 1	11.1	−0.31	+0.182	.....	.....	.....	E.	U.	
4	6.3	−0.35	−0.006	.....	.....	.....	E.	U.	
9	6.0	−0.26	+0.127	.....	.....	.....	E.	U.	

RECORD OF CONSTANTS — Continued.

Date.	Sid. Hour.	a.	b.	c.	Setting of N. C. on S. C.	c from Nadir.	Circle	Obsr.	Remarks.
1886.		s.	s.						
Mar. 13	10.4	—0.46	+0.091	.....	.... .	. .....	E.	U.	
15	.....	.....	Circle	Reversed.					
18	12.0	—0.60	—0.045	.407	.790	.....	W.	U.	
22	8.7	—0.63	—0.075	.....	.....	.....	W.	U.	
25	10.5	—0.44	—0.000	.....	... ..	.....	W.	U.	
April 1	11.0	—0.66	—0.095	.....	.....	.....	W.	U.	
4	9.2	—0.62	+0.019	.....	.....	.....	W.	U.	
7	11.1	—0.79	—0.037	.....	.....	.....	W.	U.	
12	8.7	—0.80	—0.283	.....	.....	.....	W.	U.	
18	10.0	... ..	... ...	.400	.785	.....	W.	U.	
18	10.5	—0.46	—0.386	.....	.....	.....	W.	U.	
22	9.3	—0.84	—0.515	.....	.....	.....	W.	U.	
27	14.0	—0.09	—0.284	.....	.....	.....	W.	U.	
May 2	10.6	+0.04	—0.365	.....	.....	.....	W.	U.	
6	13.0	+0.09	—0.310	.....	.....	.....	W.	U.	
10	12.2	+0.08	—0.374	.....	.....	.....	W.	U.	
15	13.0	+0.10	—0.199	.....	.....	.....	W.	U.	
17	11.3	+0.06	—0.244	.....	.....	.....	W.	U.	
18	12.8	+0.18	—0.232	.....	.....	.....	W.	U.	
20	11.5	+0.11	—0.274	.....	.....	.....	W.	U.	
24	14.7	+0.36	—0.148	.....	.....	.....	W.	U.	Struck clamp dur'g ob
26	9.5	.....	.....	.412	.812	.....	W.	U.	End of Book D.
27	14.0	+0.22	—0.162	.....	.....	.....	W.	U.	
30	14.7	+0.39	—0.207	.....	.....	.....	W.	U.	
June 3	12.6	0 00	—0.066	.....	.....	.....	W.	U.	
7	13.5	—0.16	—0.091	.....	.....	.....	W.	U.	
12	13.4	+0.07	—0.374	.....	.....	.....	W.	U.	
15	15.3	+0.15	—0.100	.....	.....	.....	W.	U.	
20	14.7	+0.04	—0.123	.....	.....	.....	W.	U.	
25	14.7	—0.28	—0.033	.....	.....	.....	W.	U.	

RECORD OF CONSTANTS—Continued.

Date.	Sid. Hour.	*a.*	*b.*	*a*	Setting of N. C. on S. C.	c from Nadir.	Circle	Obsr.	Remarks.
1886.		s.	s.						
June 29	16.0	−0.26	−0.033	.....	.....	.....	W.	U.	
July 4	15.5	+0.04	−0.306	.....	.....	.....	W.	U.	
9	18.1	−0.31	+0.009	.....	.....	.....	W.	U.	
14	6.0	.....	.....	.407	.810	.....	W.	D.	
14	17.0	−0.24	+0.174	.....	.....	.....	W.	U.	
18	16.0	−0.31	+0.178	.410	.809	.....	W.	U.	
22	18.7	−0.30	+0.150	.....	.....	.....	W.	U.	
30	17.0	−0.23	+0.178	.....	.....	.....	E.	L.	Reversed.
Aug. 5	16.4	−0.40	+0.124	.....	.....	.....	E.	U.	
7	14.0	.....	.....	.410	.758	.....	E.	U.	
7	16.5	−0.41	+0.174	.....	.....	.....	E.	U.	
12	19.5	−0.33	+0.158	.....	.....	.....	E.	L.	
15	17.9	−0.46	+0.209	.....	.....	.....	E.	L.	
18	17.9	−0.32	+0.237	.....	.....	.....	E.	L.	
22	21.0	−0.22	+0.118	.....	.....	.....	E.	U.	
26	20.5	−0.21	+0.975	.....	.....	.....	E.	U.	
31	17.6	−0.38	+0.256	.....	.....	.....	E.	U.	
Sept. 4	19.7	−0.42	+0.033	.....	.....	.....	E.	L.	
5	21.0	−0.16	±0.000	.....	.....	.....	E.	U.	
6	20.7	−0.24	0.000	.....	.....	.....	E.	U.	
7	20.5	−0.15	+0.033	.....	.....	.....	E.	U.	
10	19.0	−0.37	+0.209	.....	.....	.....	E.	L.	
15	19.4	−0.48	+0.143	.....	.....	.....	E.	L.	
15	10.0	.....	.....	.404	.772	.....	E.	U.	
19	18.8	−0.39	+0.085	.....	.....	.....	E.	U.	
23	18.9	−0.39	−0.070	.....	.....	.....	E.	L.	
28	19.0	−0.16	+0.212	.....	.....	.....	E.	L.	
Oct. 1	21.7	−0.49	+0.249	.....	.....	.....	E.	L.	
5	1.5	−0.27	+0.053	.....	.....	.....	E.	U.	
6	21.2	−0.44	+0.054	.....	.....	.....	E.	D.	

RECORD OF CONSTANTS — Continued.

Date.	Sid. Time.	a.	b.	c	Setting of N. C. on S. C.	c from Nadir.	Circle	Obsr.	Remarks.
1886.	h.	s.	s.						
Oct. 6	12		Circle reversed.			d.			
9	16.0	Glass	reticle removed,			cleaned and		replaced.	
10	18.9	—0.18	+0.023	.....	.....	... ...	W.	U.	
10	17.2	.....	.....	0.924	.812	.....	W.	U.	
12	Eye-end	removed	and re	placed.		Micrometer-box taken			
	apart.								
12	14.0	.....	.....	0.162	.791	.....	W.	U.	
13	12.0	.....	.....	0.148	.804	.....	W.	U.	
15	19.3	—0.52	+0.075	.....	.....	.....	W.	L.	
16	17.3	.....	.....	.148	.807	.....	W.	L.	
19	20.4	—0.76	—0.042	... ..	.....	.....	W.	L.	
25	2.1	—0.58	+0.166	.....	.....	.....	W.	U.	
30	20.9	—0.75	—0.031	.....	.....	.....	W.	L.	
Nov. 2			Circle reversed.			d.			
3	0.0	—0.46	+0.046	... ..	.....	... ...	E.	L.	
4	13.5	.....	.....	.150	.756	.....	E.	U.	
7	20.2	—0.71	+0.142	.....	.....	.....	E.	U.	
10	2.0	—0.62	—0.108	.....	.....	.....	E.	U.	
14	20.4	—0.84	—0.090	.....	.....	.....	E.	U.	
23	2.0	.....	—0.113	.....	.....	.....	E.	U.	
25	2.5	—0.69	—0.146	.....	.....	.....	E.	U.	
	Screws	fastening	eye-end	tightened.					
26	14.5	.....	.....	.108	.798	.....	E.	U.	
26	15.0	.....	.....	.101	.791	.....	E.	L.	
29	0.4	—0.87	—0.157	.....	.....	.....	E.	U.	
Dec. 1	1.5	—0.58	—0.129	.....	.....	.....	E.	U.	
6	22.8	—0.85	—0.486	.....	.....	.....	E.	U.	
6	4.5	—0.77	—0.510	.....	.....	.....	E.	U.	

RECORD OF CONSTANTS — Continued.

Date.	Sid Time.	*a.*	*b.*	*c.*	Setting of N. C. on S. C.	*c* from Nadir.	Circle.	Observer.	Remarks.
1886.	h.	s.	s.						
Dec. 6	15.0		Circle reversed.						
7	15.0	.....	.....	.106	.765	.....	W.	U.	
8	23.8	−0.81	−0.448	.....	.....	.....	W.	U.	
14	1.4	−0.72	−0.355	.....	.....	.....	W.	U.	
17	22	.....	.....	.106	.782	.....	W.	U.	
19	1.5	−0.41	−0.425	.....	.....	.....	W.	U.	
22	0.0	−0.62	−0.427	.....	.....	.....	W.	U.	
26	5.0	−0.25	−0.212	.....	.....	.....	W.	U.	
28	22.9	−0.37	−0.402	.....	.....	.....	W.	L.	
31	0.3	−0.98	−0.473	.....	.....	.....	W.	L.	
1887.									
Jan 4	3.9	−0.62	−0.241	.....	.....	.....	W.	U.	
9	1.0	−0.61	−0.175	.....	.....	.....	W.	U.	
11	19.0	.....	.....	.107	.830	.....	W.	U.	
14	1.0	−0.68	−0.094	.....	.....	.....	W.	L.	
15	1.5	−0.96	−0.059	.....	.....	.....	W.	U.	
25	5.3	−0.69	+0.195	.....	.....	.....	W.	U.	
27	7.9	−0.67	+0.202	.....	.....	.....	W.	U.	
Feb. 3	2.0	−0.84	+0.174	.....	.....	.....	W.	L.	
8	2.8	−0.74	+0.241	.....	.....	.....	W.	L.	
8	20.0	Glass Reticle taken out and cleaned.							
8	21.0	.....	.....	.111	.838	.....	W.	U.	
13	3.0	−0.57	+0.500	.....	.....	.....	W.	U.	
14	21.0	.....	.....	.108	.893	.....	W.	U.	
16	22.0		Circle reversed.						
21	8.3	.....	+0.316	.....	.....	.....	E.	U.	
24	5.8	−0.54	+0.424	.....	.....	.....	E.	U.	
27	5.8	−0.47	+0.485	.....	.....	.....	E.	U.	
Mar. 2	6.0	−0.67	+0.239	.....	.....	.....	E.	U.	
6	8.8	−0.67	+0.290	.....	.....	.....	E.	U.	

RECORD OF CONSTANTS—Continued.

Date.	Sid. Hour.	a.	b.	c.	Setting of N. C. on S. C.	c. from Nadir.	Circle.	Observer.	Remarks.
1887.	h.	s.	s.						
Mar. 10	5.0	−0.61	+0.227	.....	.....	... ...	E.	U.	
21	23.5	.....	.....	.102	.619	.....	E.	U.	
22	7.7	−0.60	+0.278	... ..	.....	.....	E.	L.	
28	7.5	−0.54	+0.380	.....	.....	.....	E.	U.	

HORIZONTAL FLEXURE FROM OPPOSING COLLIMATORS.

Sixty additional observations of the horizontal flexure have been made. These, with the observations of this constant which have been published in preceding volumes, make a total of 188. Of these, only 43 have been made with the circle West. From the summary of these observations given below, it will be noticed that the observers C., U. and L. agree in obtaining a larger determination of the flexure circle East than circle West. Had this fact been noticed sooner, greater pains would have been taken to make the number of observations circle W. and E. more nearly equal. The later observations circle East have been taken at different times and widely different temperatures and indicate no considerable change in the horizontal flexure as determined in this position of the circle. It will be noticed that the results of the observers Hn. and T., circle E., agree between themselves, but are discordant with that of observer C. (derived at the same time) and with the later values of the flexure got by observers L. and U.

SUMMARY OF OBSERVATIONS OF THE HORIZONTAL FLEXURE.

Date.	Observer.	No. obs.	W.	E.
1884, May	Hn.	18		—0.″13
1884, June–July	C.	6	—0.″01	
1884, June–July	C.	10		+0.41
1883–1884, Oct.–July	T.	10	+0.15	
1883–1884, Oct.–July	T.	16		—0.26
1885, June	C.	6		+0.98
1885, Aug.–Nov.	L.	17		+0.47
1885, Aug.–Nov.	L.	9	+0.18	
1886, Jan.	U.	24		+0.54
1886, Jan.	L.	12		+0.58
1886, July	U.	24		+0.60
1886, Nov.	U.	8		+0.51
1887, Feb.	U.	18	+0.06	
1887, Feb.	U.	10		+0.47

HORIZONTAL FLEXURE.

M. U. OBSERVER.

Circle East.

DATE; 1886.	Temp.	N. C. Micrometer Head.	h; Telescope turned through Zenith.	h; Telescope turned through Nadir.
	°		′	′
July 31.....	80	Down.	+0.48	+0.43
July 31	80	Down.	+0.85	+0.83
August 1.....	73	Down.	+0.36	+0.26
August 1.....	73	Down,	+0.43	+0.40
August 3.....	77	Down.	+0.72	+0.53
August 3.....	77	Down.	+0.82	+0.60
August 4.....	76	Up.	+0.59	+0.58
August 4.....	76	Up.	+0.40	+0 38
August 5.....	77	Up.	+0.97	+0.50
August 5.....	77	Up.	+0.63	+0.48
August 6.....	72	Up.	+0.98	+0.81
August 6.....	72	Up.	+0.80	+0.58
			+8.03	+6.38
			+0.67	+0.53
			+0″.60±0″.03	

Circle East.

DATE; 1886.	Temp.	N. C. Micrometer Head.	h; Telescope turned through Zenith.	h; Telescope turned through Nadir.
	°		′	′
November 21..	40	Up.	+0.52	+0.42
November 21..	40	Up.	+0.55	+0.65
November 22..	41	Down.	+0.44	+0.35
November 22..	41	Down.	+0.60	+0.56
			+2.11	+1.98
			+0″.51 ± 0″.024	

HORIZONTAL FLEXURE.

M. U. OBSERVER.

DATE; 1887.	Temp.	Circle.	h; Telescope turned through Zenith.	h; Telescope turned through Nadir.
	°		″	″
February 6.....	25	W.	+0.38	+0.35
February 7.....	27	W.	+0.02	−0.24
February 7	27	W.	−0.08	−0.14
February 9.....	32	W.	+0.02	+0.01
February 15.....	31	W.	+0.10	−0.06
February 15.....	31	W.	+0.20	+0.12
February 16.....	30	W.	−0.08	−0.10
February 16.....	30	W.	−0.02	+0.01
February 16.....	30	W.	+0.31	+0.25
Sums	.....	.....	+0″.85	+0″.20
Means	.....	.....	+0″.06	±0″.028
February 17.....	32	E.	+0.29	+0.37
February 17.....	32	E.	+0.40	+0.40
February 17.....	30	E.	+0.70	+0.72
February 17.....	30	E.	+0.36	+0.40
February 17.....	30	E.	+0.47	+0.58
Sums	.....	.....	2.22	2.47
Means	.....	.....	+0″.47	±0″.032

DIVISION ERRORS OF THE NADIR AND POLARIS LINES.

During the summer of 1886 the errors of the Nadir and Polaris lines of the meridian circle were measured. The method used is adapted to the exact measurement of the errors of a limited number of lines, but is too laborious for general application.

The errors of the nadir lines were first measured. They are,

Circle W. 81° 28′, 171° 28′, 261° 28′ and 351° 28′.

Circle E. 81° 36′, 171° 36′, 261° 36′ and 351° 36′.

On account of mechanical difficulties in adjusting the microscopes at the proper distance from each other on the microscope bearer, it was impossible to refer the nadir lines directly to the diameter 0°–180°. They were therefore referred to another diameter. For this purpose the diameter 20°–200° was chosen and its error measured. The four microscopes were arranged as is shown in figure 1. The circle-readings increase in the direction of the arrow head.

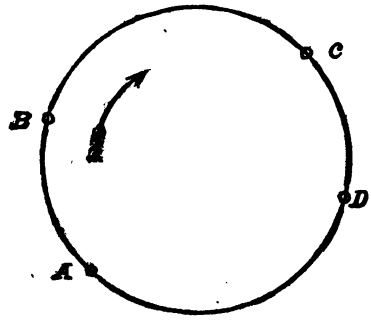

Fig. 1.

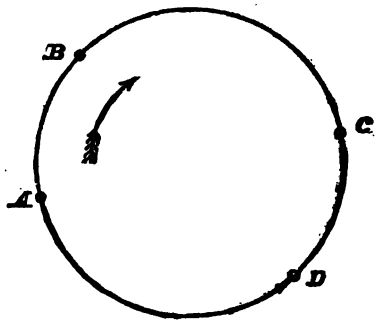

Fig. 2.

The following programme which was followed in case of the diameter 81° 28′–261° 28′ will serve to illustrate the method used.

The microscopes A and C were placed 180° apart as also were B and D—the two distances A B and C D being each equal to 61° 28′ within a few seconds.

This adjustment is made a few hours before the observations are taken.

I. Index set at 334° 0′, 20° under A, 81° 28′ under B, 200° under C and 261° 28′ under D.
Microscopes read three times around.

II. Repetition series carried forward six terms. The microscopes were read once round for each term of the repetition series.

III. Index set at 154° 0′, 200° under A, 261° 28′ under B, 20° under C and 81° 28′ under D.
Microscopes read three times round.

IV. Repetition series carried forward six terms.

V. Index set at 334° 0′, 20° under A, 81° 28′ under B, 200° under C and 261° 28′ under D.
Microscopes read three times round.

VI. Index set at 154° 0′, 200° under A, 261° 28′ under B, 20° under C and 81° 28′ under D.
Microscopes read three times round.

VII. Repetition series carried backward six terms.

VIII. Index set at 154° 0′, 200° under A, 261° 28′ under B, 20° under C and 81° 28′ under D.
Microscopes read three times round.

IX. Repetition series carried backward six terms.

X. Index set at 334° 0′, 20° under A, 81° 28′ under B, 200° under C and 261° 28′ under D.
Microscopes read three times round.

Twelve terms are used in the repetition series so that the circle may be gone over about twice in order to approximately eliminate the effect of eccentricity in the determination of each of the four microscope distances AB, CD, DA and BC. For each separate set of observations on the same diameter, the repetition series was commenced at a different place on the circle.

The repetition series is carried backward of course to eliminate any change in the positions of the microscopes which is proportional to the time. It will be noticed that

the comparisons of the arcs to be determined with the known microscope distances are symmetrically distributed with reference to the middle of the repetition series. The thermometers at the North and South collimators were read for each observation and their difference was never found to be greater than one degree.

One set of observations carried out according to this program, involves 30 settings of the circle and 168 microscope readings.

The twelve terms of the repetition series forward and backward give 24 determinations of each of the four microscope distances. The sum of these four distances must be 360° which condition gives a check on their numerical values. The errors of any two lines 180° apart may be determined at the same time, and the mean of these errors gives the error of the diameter. One set of observations gives twelve determinations of the error of each line—six referred to the line 0° (20° in case of the nadir lines) and six referred to 180° (200° in case of the nadir lines). The mean of these gives the error of the diameter. The error of the diameter 0°—180° is assumed to be zero, and all diameters are ultimately referred to it.

In table 3 the 2d and 3d columns headed AB and CD contain the error of the line 81° 28′ (referred to 20°) measured on the microscope distances AB and CD. Each of the quantities in these columns is the mean of three comparisons of the arc to be measured with the known microscope distances. The numbers in columns AB and CD are determinations of the same quantity and ought to differ only by the accidental error of observation. The mean of column AB is—0″.95, and of column CD—0″.17. It was at first thought that this discordance might be due to some defect in the adjustments or in the manner of observing, and various modifications of both were tried but the difference remained about the same until the change in the arrangement of the microscopes was made as is shown in figure 2.

In the new arrangement the microscopes are lettered as before, but A and B occupy a higher instead of a lower position than C and D. Three sets of measures were taken on

different days, and according to these measures the error of the line 81° 28′ (referred to 20°) is + 0″.01 on the microscope-distance AB, and − 0″.41 on the microscope-distance CD—the disagreement now being in the opposite direction. These last three measures were made at an average temperature of 73°, the others at 60°. A like discrepancy, almost the same in amount, appears in the case of the line 81° 36′ and the same trouble has arisen in the case of several other lines.

Whether or not this difference is due to irregular flexure of the circle, it is true that even in the absence of knowledge as to the cause of the difference, the mean of the two discordant results is entitled to greater confidence than either alone. These considerations seem to justify the use of *two* "movable" microscopes in measuring division errors by the method of "repetition series."

The observations on the diameter 81° 28′ − 261° 28′ seem to indicate a considerable change in the error of this diameter, due to temperature. On no other diameter is there a sufficient number of observations at different temperatures to show certainly any change from this cause, although it has no doubt operated to increase the probable errors of the results.

The probable errors have been computed from the rather meager data available. They must be considered as approximate only.

The observations on the nadir lines were all made at a temperature of about 60°, the average temperature being 61° Fahr. In case of the diameter 81° 28′ − 261° 28′ only the first 8 observations were used in deriving the final connections to the nadir lines, as the mean of the temperatures at which they were made is 60°, and the other observations were made at considerably higher or lower temperatures. For the same reason, in case of the diameter 351° 36′ − 171° 36′ only the first 3 observations have been used. This is important, since it is more necessary to know the difference between the division errors of the nadir lines, Circle W and Circle E, than to know their absolute values. Fortunately the determination of this dif-

ference is no doubt far more exact than that of the errors themselves, since nearly the same constant errors must enter into the measurement of each set of lines, lying as they do in nearly the same position on the circle. In a determination of the latitude by observations of the stars in both positions of the instrument the errors of the nadir lines, if equal circle W and E, would be eliminated. Therefore the nadir lines should be the same circle W and E. They could easily be made so in this instrument, but it has not been thought advisable to make the change under present conditions.

The errors of the nadir lines were measured by two observers M. U. and A. M. L., there being usually three observations on each line by each observer. In combining the two results, weights were assigned according to the number of observations. The error of the diameter 20° – 200° was also measured by both observers, the method being similar to the one described above.

The observations on the Polaris lines were made by observer U. only, and were referred directly to the diameter 0°—180°. At least three observations were made on each line, and the average temperature was 78° Fahr. The work was all done in the daytime with the shutters of the meridian-circle-room closed.

The errors are given as corrections to be applied additively to the circle readings, excepting the final corrections to the latitude from Polaris which are to be applied to the observed latitude.

These corrections are to be applied to the actual microscope readings on the lines and are opposite in sign to the corrections which should be applied to the arcs themselves since the microscope readings increase in a direction opposite to that in which the divisions of the circle increase, owing to the inversion of the images of the lines by the objectives of the microscopes.

Below are given the corrections for division errors to be applied to the nadir, the final corrections for division errors to be applied to the latitude derived from observations of Polaris and a summary of errors of the different diameters.

CORRECTIONS FOR DIVISION ERRORS TO BE APPLIED TO THE NADIR.

Nadir Circle W.	$-0''.38 \pm 0''.04$
Nadir Circle E.	$-0''.36 \pm 0''.04$

CORRECTIONS TO LATITUDE FROM POLARIS.

		Error of Polaris lines.	Error of Polaris lines + error of Nadir lines.
Polaris, U. C.	Circle W.	$+0''.06 \pm 0''.04$	$-0''.32 \pm 0''.05$
	Circle E.	$+0''.08 \pm 0''.04$.	$+0''.45 \pm 0''.05$
Polaris, L. C.	Circle W.	$-0''.20 \pm 0''.04$	$-0''.58 \pm 0''.05$
	Circle E.	$-0''.24 \pm 0''.04$	$+0''.12 \pm 0''.05$

SUMMARY OF CORRECTIONS TO DIAMETERS.

	20°—200°	$+0''.24 \pm 0''.03$	
Nadir Circle W.	81° 28′—261° 28′	$-0''.01 \pm 0''.03$	$-0''.62 \pm 0''.02$
Nadir Circle W.	351° 28′—171° 28′	$-1''.23 \pm 0''.02$	
Nadir Circle E.	81° 36′—261° 36′	$-0''.02 \pm 0''.01$	$-0''.60 \pm 0''.02$
Nadir Circle E.	351° 36′—171° 36′	$-1''.19 \pm 0''.04$	

Error of Nadir Circle W. minus Error of Nadir Circle E. $= -0''.020 \pm 0''.028$

Polaris U. C. Circle W.	37° 4′—217° 4′	$+0''.23 \pm 0''.05$	$-0''.06 \pm 0''.04$
Polaris U. C. Circle W.	127° 4′—307° 4′	$-0''.35 \pm 0''.05$	
Polaris U. C. Circle E.	36° 0′—216° 0′	$+0''.19 \pm 0''.05$	$+0''.08 \pm 0''.04$
Polaris U. C. Circle E.	126° 0′—306° 0′	$-0''.02 \pm 0''.05$	
Polaris L. C. Circle W.	39° 42′—219° 42′	$+0''.48 \pm 0''.06$	$+0''.20 \pm 0''.04$
Polaris L. C. Circle W.	129° 42′—309° 42′	$-0''.08 \pm 0''.05$	
Polaris L. C. Circle E.	33° 22′—213° 22′	$+0''.18 \pm 0''.05$	$-0''.24 \pm 0''.04$
Polaris L. C. Circle E.	123° 22′—303° 22′	$-0''.37 \pm 0''.05$	

In the following tables are given the results for each line measured, as derived from the microscope distances A B, C D, D A and B C at each observation.

In table 1, for example, the 1st column gives the date of the observation, the 2nd and 3rd columns give the error of

the line 20° obtained by comparison with the microscope distances A B and C D respectively. The 4th and 5th columns give the error of the line 20° obtained by comparison with the microscope distances D A and B C respectively. The 6th column is the mean of the numbers on the same line in the 2nd, 3rd, 4th and 5th columns and is the error of the *line* 200° referred to the *diameter* 0°—180°. The 7th and 8th columns give the error of the line 200° got by comparison with the microscope distances A B and C D. The 9th and 10th columns give the error of the line 200° got by comparison with the microscope distances D A and B C. The 11th column gives the means of numbers on the same line in columns 7, 8, 9 and 10 and is the error of the *line* 200° referred to the *diameter* 0°—180°. The 12th column gives the mean of the errors of the lines 20° and 200° and is the error of the diameter 20°—200° referred to 0°—180°. The 13th column gives the mean of the temperatures at the North and South collimators.

TABLE 1.

Diameter 20°—200° *referred to diameter* 0°—180°.

U. Observer.

1886.	20°					200°					Error of diameter 20°–200°	Temp.
	A—B.	C—D.	D—A.	B—C.	Error of line 20°	A—B.	C—D.	D—A.	B—C.	Error of line 200°		
	″	″	″	″	″	″	″	″	″	″	″	°
April 14	−0.06	.....	.....	+0.33	+0.14	.....	+0.69	+0.32	.....	+0.50	+0.32	62
April 15	−0.09	+0.26	+0.23	+0.66	+0.28	+0.58	+0.26	−0.50	+0.54	+0.22	+0.25	60
April 16	+0.14	+0.13	+0.23	+0.77	+0.32	+0.70	+0.46	−0.16	+0.60	+0.40	+0.36	60
April 18	+0.19	+0.34	+0.81	+0.59	+0.48	+0.65	+0.02	−0.36	+0.20	+0.13	+0.30	64
April 20	+0.18	+0.07	+0.44	+0.75	+0.36	+0.62	+0.29	−0.28	+0.26	+0.22	+0.29	60
April 22	−0.16	−0.58	+0.28	+0.64	+0.04	+0.59	+0.13	−0.67	−0.26	−0.05	0.00	69
Means	+0.04	+0.04	+0.40	+0.62	+0.27	+0.63	+0.31	−0.27	+0.27	+0.24	+0″.25 ±0.04	62°

TABLE 2.

Diameter 20°—200° *referred to diameter* 0°—180°.

L. Obver.

1886.	20°					200°					Error of diameter 20°—200°.	Temp.
	A—B.	C—D.	D—A.	B—C.	Error of line 20°.	A—B.	C—D.	D—A.	B—C.	Error of line 200°		
	″	″	″	″	″	″	″	″	″	″	″	°
April 16	−0.05	−0.14	+0.08	+1.13	+0.26	+0.78	+0.90	+0.27	+0.94	+0.72	+0.49	58
April 18	−0.42	+0.22	+1.30	+0.56	+0.42	+1.02	−0.20	−1.11	−0.04	−0.08	+0.17	60
April 22	−0.98	−0.01	+1.08	+0.24	+0.08	+1.40	+0.10	−1.14	+0.28	+0.16	+0.12	68
April 23	−0.77	−0.10	+1.20	−0.30	+0.01	+1.43	−0.13	−0.61	+0.12	+0.20	+0.10	62
Means	−0.56	−0.01	+0.92	+0.41	+0.19	+1.16	+0.17	−0.65	+0.32	+0.24	+0″.22 ±0 .06	63°

Mean of all adopted +0″.24±0″.03.

TABLE 8.

Diameter 81° 28′—261° 28′ *referred to diameter* 20°—200°.

Nadir Circle W. U. Observer.

1886.	81° 28′					261° 28′					Error of diam'ter 81° 28′. 261° 28′ Referr'd to 20°–200°	Temp.
	A—B.	C—D.	D—A.	B—C.	Error of line 81° 28′.	A—B.	C—D.	D—A.	B—C.	Error of line 261° 28′.		
	″	″	″	″	″	″	″	″	″	″	″	°
April 29	−1.32	−0.06	−1.28	−0.57	−0.81	−0.38	+0.93	+0.17	+0.83	+0.39	−0.21	54
April 29	−1.15	−0.24	−0.72	−0.86	−0.62	−0.36	+1.02	+0.25	+0.64	+0.39	−0.12	57
April 30	−0.91	−0.41	−1.11	−0.39	−0.70	−0.16	+0.72	+0.16	+0.64	+0.36	−0.18	54
May 16	−1.09	−0.11	−0.63	−0.51	−0.58	−0.19	+1.23	+0.66	+0.34	+0.51	−0.04	58
May 17	−0.79	+0.06	−0.87	−0.03	−0.41	0.00	+1.19	+0.43	+0.93	+0.64	+0.12	58
May 18	−0.93	+0.32	−0.36	−0.45	−0.35	−0.12	+1.20	+0.72	+0.56	+0.59	+0.12	64
May 20	−1.30	+0.19	−0.40	−0.89	−0.60	+0.27	+1.19	+0.86	+0.86	+0.80	+0.10	68
May 20	−0.86	−0.12	−0.92	−0.53	−0.61	+0.21	+1.43	+1.11	+1.00	+0.94	+0.16	69
May 21	−0.08	−0.47	−0.20	−0.65	−0.35	+1.30	+0.29	+0.87	+1.04	+0.87	+0.26	72
May 22	−0.13	−0.25	−0.07	−0.34	−0.20	+1.12	+0.92	+1.14	+0.94	+1.03	+0.42	75
May 24	+0.16	−0.52	0.00	−0.71	−0.27	+1.00	+0.85	+1.72	+0.48	+1.01	+0.37	71
Nov. 11	−1.21	−0.42	−0.03	+0.24	−0.36	+0.66	+1.19	−0.23	−0.22	+0.35	0.00	36
Nov. 12	−1.61	−0.26	+0.21	+0.07	−0.40	+0.44	+1.22	+0.31	−0.39	+0.40	0.00	37
Nov. 18	−1.39	−0.11	+0.19	−0.08	−0.35	+0.37	+1.30	+0.16	−0.44	+0.35	0.00	28
Nov. 23	−1.61	−0.16	+0.02	+0.33	−0.36	+0.28	+0.99	+0.30	−0.13	+0.36	0.00	20
Means	−0.95	−0.17	−0.41	−0.32	−0.46	+0.30	+1.04	+0.58	+0.47	+0.60	+0.07	55

Mean of only first 8 observations used −0.01″ Temp. =60°.

TABLE 4.

Diameter 81° 28′—261° 28′ *referred to diameter* 20°—200°.

Nadir Circle W. L. Observer.

1886.	81° 28′					261° 28′					Error of diam'ter 81° 28′ 261° 28′ Referr'd to 20°–200°	Temp.
	A—B	C—D	D—A	B—C	Error of line 81° 28′	A—B	C—D	D—A	B—C	Error of line 261° 80′		
	″	″	″	″	″	″	″	″	″	″	″	°
May 4.....	−0.99	−0.35	−0.62	−0.71	−0.67	−0.16	+1.20	+0.92	+0.11	+0.52	−0.08	59
May 5.....	−1.15	−0.56	−0.86	−0.74	−0.83	−0.60	+1.55	+1.46	−0.30	+0.53	−0.15	60
May 17....	−0.81	−0.37	−1.29	+0.63	−0.46	−0.53	+2.05	+0.59	+0.70	+0.70	+0.12	60
Means	−0.98	−0.43	−0.92	−0.27	−0.65	−0.43	+1.60	+0.99	+0.17	+0.58	−0.04	60

TABLE 5.

Diameter 351° 28′ — 171° 28′ *referred to diameter* 20° — 200°.

Nadir Circle W. U. Observer.

1886.	351° 28′					171° 28′					Error of diameter 351° 28′ 171° 28′ Referr'd to 20° — 200°.	Temp.
	A—B.	C—D.	D—A.	B—C.	Error of line 351° 28′.	A—B.	C—D.	D—A.	B—C.	Error of line 171° 28′.		
	″	″	″	″	″	″	″	″	″	″	″	°
May 9.....	−1.47	−1.43	−1.79	−1.54	−1.56	−1.14	−1.21	−1.02	−0.89	−1.07	−1.32	56
May 10.....	−1.32	−1.02	−1.51	−1.78	−1.41	−1.10	−1.25	−0.35	−1.07	−0.94	−1.18	69
May 11.....	−1.58	−0.82	−1.48	−1.92	−1.45	−1.09	−1.08	−0.01	−1.20	−0.84	−1.14	65
Means	−1.46	−1.09	−1.59	−1.75	−1.47	−1.11	−1.18	−0.46	−1.05	−0.95	−1.21	60

TABLE 6.

Diameter 351° 28′ — 171° 28′ *referred to diameter* 20° — 200°.

Nadir Circle W. L. Observer.

1886.	351° 28′					171° 28′					Error of diam'ter 351° 28′ 171 °28′ Refer'd to 20°–200°	Temp.
	A—B	C—D	D—A	B—C	Error of line 351° 28′	A—B	C—D	D—A	B—C	Error of line 171° 28′		
	″	″	″	″	″	″	″	″	″	″	″	
May 7.....	−1.80	−0.78	−2.07	−1.20	−1.46	−1.31	−1.20	−0.88	−0.94	−1 08	−1.27	62°
May 9.....	−1.22	−0.95	−1.41	−1.37	−1.24	−1.61	−1.10	−1.20	−0.91	−1.20	−1.22	58
May 10..... ...	−1.68	−0.77	−1.31	−1.37	−1.28	−1.51	−1.09	−0.83	−1.37	−1.20	−1.24	63
Means.....	−1.57	−0.83	−1.60	−1.31	−1.33	−1.48	−1.13	−0.97	−1.07	−1.16	−1.24	61

TABLE 7.

Diameter 81° 36′ — 261° 36′ *referred to diameter* 20° — 200°.

Nadir Circle E. U. Observer.

1886.	81° 36′.					261° 36′.					Error of diamet'r 81° 36′ 261° 36′. Referr'd to 20°–200°	Temp.
	A—B	C—D	D—A	B—C	Error of line 81° 36′.	A—B	C—D	D—A	B—C	Error of line 261° 36′.		
	″	″	″	″	″	″	″	″	″	″	″	°
May 5	−1 04	+0.15	−1.30	−0.34	−0.63	−0.32	+1.04	+0.34	+1.14	+0.55	−0·04	62
May 6	−0.99	+0.06	−0.59	−0.71	−0.56	−0.10	+0.78	+0.49	+0.54	+0.43	−0.06	61
May 6	−0.74	−0.08	−0.68	−0.59	−0.52	+0.25	+0.48	+0.33	+0.85	+0.48	−0.02	58
Means	−0.92	+0.04	−0.86	−0.55	−0″.57	−0.06	+0.77	+0.39	+0.81	+0″.48	−0″.04	60°

TABLE 8.

Diameter 81° 36′ — 261° 36′ *referred to diameter* 20° — 200°.

Nadir Circle E. L. Observer.

1886.	81° 36′					261° 36′					Error of diamet'r 81° 36′ 261° 36′. Referr'd to 20°--200°	Temp.
	A—B	C—D	D—A	B—C	Error of line 81° 36′	A—B	C—D	D—A	B—C	Error of line. 261° 36′		
	″	″	″	″	″	″	″	″	″	″	″	°
May 5.....	—0.71	+0.22	—1.24	—0.63	—0.59	—0.72	+1.30	+1.21	+0.69	+0.62	+0.02	63
May 7.....	—0.62	+0.03	—0.68	—0.12	—0.35	+0.40	+0.31	—0.22	+1.08	+0.39	+0.02	61
Means...	—0.66	+0.12	—0.96	—0.38	—0″.47	—0.16	+0.80	+0.50	+0.88	+0″.50	+0″.02	62

TABLE 9.

Diameter 351° 36′—171° 36′ *referred to Diameter* 20° — 200°.

Nadir Circle E. U. Observer.

1886.	351° 36′					171° 36′					Error of diamet'r 351° 36′ 171° 36′. Referr'd to 20°-200°	Temp.
	A—B	C—D	D—A	B—C	Error of line 351° 36′	A—B	C—D	D—A	B—C	Error of line 171° 36′		
	″	″	″	″	″	″	″	″	″	″	″	
May 11	−1.46	−1.14	−1.59	−1.69	−1.47	−1.06	−0.86	−0.46	−0.68	−0.76	−1.12	63°
May 12	−1.23	−0.97	−1.50	−1.55	−1.31	−1.21	−0.87	−0.63	−0.60	−0.83	−1.07	64
May 13	−1.27	−0.86	−1.85	−1.24	−1.30	−0.84	−1.09	−0.44	−0.50	−0.72	−1.01	59
Means	−1.32	−0.99	−1.65	−1.49	−1″.36	−1.04	−0.94	−0.51	−0.59	−0″.77	−1″.07	62°

TABLE 10.

Diameter 351° 36′—171° 36′ *referred to diameter* 20°—200°.

Nadir Circle E. L. Observer.

1886.	351° 36′					171° 36′					Error of diamet'r 351°36′ 171° 36′. Referr'd to 20°- 200°	Temp.
	A—B	C—D	D—A	B—C	Error of line 351° 36′.	A—B	C—D	D—A	B—C	Error of line 171° 36′.		
	″	″	″	″	″	″	″	″	″	″	″	
May 11	—2.10	—0.93	—1.25	—2.09	—1.59	—1.80	—0.51	—0.64	—1.36	—1.08	—1.34	65°
May 13	—1.94	—0.84	—1.48	—1.58	—1.46	—1.88	—0.62	—1.13	—0.47	—0.88	—1.17	69
May 13	—1.93	—0.89	—1.86	—1.54	—1.55	—1.81	—1.06	—1.16	—1.14	—1.29	—1.42	60
July 23	—1.27	—1.18	—0.20	—1.70	—1.09	—1.12	+0.21	—0.60	—0.85	—0.59	—0.84	76
July 25	—1.35	—1.23	—0.40	—1.51	—1.12	—0.97	—0.01	—0.71	—0 66	—0 59	—0.86	79
Means	—1.72	—1.01	—1.04	—1.68	—1.36	—1.52	—0.28	—0.85	—0.90	—0.89	—1.13	70

Mean of only first three observations used —1″.71. Temp. = 65°.

TABLE 11.

Diameter 37° 4′ —217° 4′.

Circle W, Polaris U. C.

1886.	37° 4′					217° 4′					Error of diameter. 37° 4′ 217° 4′.	Temp.
	M—N.	O—P.	P—M.	N—O.	Error of line 37° 4′.	M—N.	O—P.	P—M.	N—O.	Error of line 217° 4′.		
	″	″	″	″	″	″	″	″	″	″	″	°
June 28	−0.46	−0.22	−0.53	+0.11	−0.27	+0.68	+0.81	+0.25	+0.99	+0.68	+0.20	72
June 29	−0.84	−0.04	−0.47	+0.18	−0.29	+0.76	+0.97	−0.05	+1.19	+0.72	+0.22	75
June 29	−0.53	−0.11	−0.15	−0.09	−0.22	+1.01	+0.78	+0.80	+1.06	+0.78	+0.28	73
Means	−0.61	−0.12	−0.38	+0.07	−0.26	+0.82	+0.84	+0.17	+1.08	+0.73	+0.23	73

TABLE 12.

Diameter 307° 4′— 127° 4′.

Circle W, Polaris U. C.

1886.	307° 4′					127° 4′					Error of diameter 307° 4′ 127° 4′.	Temp.
	M—N.	O—P.	P—M.	N—O.	Error of line 307° 4′.	M—N.	O—P.	P—M.	N—O.	Error of line 127° 4′.		
	″	″	″	″	″	″	″	″	″	″	″	°
July 5.....	−0.22	+0.30	−0.21	+0.66	+0.13	−1.03	−0.26	−1.38	−0.26	−0.73	−0.30	84
July 6.....	−0.70	+0.42	−0.57	+0.50	−0.09	−0.97	−0.24	−1.06	−0.38	−0.66	−0.38	81
July 7.....	−0.75	+0.63	−0.14	+0.24	−0.00	−1.27	−0.16	−0.88	−0.77	−0.77	−0.38	79
Means.....	−0.56	+0.45	−0.31	+0.47	+0.01	−1.09	−0.22	−1.11	−0.47	−0.72	−0.35	81

TABLE 13.

Diameter 39° 42′—219° 42′.

Circle W. Polaris S. P.

1886.	39° 42′					219° 42′					Error of diameter. 39° 42′ 219° 42′	Temp.
	M—N	O—P	P—M	N—O	Error of line 39° 42′	M—N	O—P	P—M	N—O	Error of line 219° 42′		
	″	″	″	″	″	″	″	″	″	″	″	
June 30	−0.55	+0.49	−0.10	−0.02	−0.05	+1.51	+1.51	+0.98	+2.09	+1.52	+0.74	78°
July 1	−1.02	−0.19	−0.39	−0.55	−0.54	+1.02	+0.97	+0.49	+1.21	+0.92	+0.19	80
July 1	−0.44	−0.12	−0.20	−0.17	−0.23	+0.89	+0.93	+0.67	+0.98	+0.87	+0.32	75
July 19	−0.11	−0.07	−0.33	+0.09	−0.10	+1.24	+1.27	+1.06	+1.51	+1.27	+0.58	77
July 19	−0.02	+0.06	−0.05	+0.19	+0.05	+1.14	+1.19	+0.99	+1.26	+1.14	+0.59	73
Means	−0.43	+0.03	−0.21	−0.09	−0.18	+1.16	+1.17	+0.84	+1.41	+1.14	+0.48	77

TABLE 14.

Diameter 309° 42′ — 129° 42′.

Circle W. Polaris S. P.

1886.	309° 42′					129° 42′					Error of diameter 309° 42′ 129° 42′	Temp.
	M—N	O—P	P—M	N—O	Error of line 309° 42′	M—N	O—P	P—M	N—O	Error of line 129° 42′		
	″	″	″	″	″	″	″	″	″	″	″	°
July 11.....	—0.02	+0.45	+0.35	+0.44	+0.30	—0.82	—0.38	—0.82	—0.75	—0.69	—0.20	80
July 12.....	+0.19	+0.39	+0.28	+0.66	+0.38	—0.77	—0.38	—1.04	—0.48	—0.67	—0.14	81
July 12.....	+0.13	+0.74	+0.47	+1.36	+0.63	—0.83	—0.14	—1.44	+0.47	—0.48	+0.10	78
Means	+0.10	+0.53	+0.37	+0.82	+0″.45	—0.81	—0.30	—1.10	—0.25	—0.61	—0″.08	80

TABLE 15.

Diameter 36° 0′—216° 0′.

Circle E. Polaris U. C.

1886.	36° 0′.					216° 0′.					Error of diameter 36° 0′ 216° 0′	Temp.
	M—N.	O—P.	P—M.	N—O.	Error of line 36° 0′	M—N.	O—P.	P—M.	M—O.	Error of line 216° 0′		
	″	″	″	″	″	″	″	″	″	″	″	
July 2.....	−0.61	−0.95	−0.26	−0.06	−0.47	+1.16	+0.86	+0.32	+0.48	+0.70	+0.12	80
July 2.....	−0.34	−1.05	−0.18	+0.26	−0.33	+1.24	+0.89	+0.30	+0.38	+0.70	+0.18	79
July 3.....	−0.08	−1.02	−0.10	+0.44	−0.19	+1.20	+0.96	+0.45	+0.28	+0.72	+0.27	80
Means	−0.34	−1.01	−0.18	+0.21	−0.33	+1.20	+0.90	+0.36	+0.38	+0.71	+0.19	80°

TABLE 16.

Diameter 306° 0′—126° 0′.

Circle. E. Polaris U. C.

1886.	306° 0′					126° 0′					Error of diameter 306° 0′ 126° 0′.	Temp.
	M—N.	O—P.	P—M.	N—O.	Error of line 306° 0′.	M—N.	O—P.	P—M.	N—O.	Error of line 126° 0′.		
	″	″	″	″	″	″	″	″	″	″	″	°
July 8.....	−0.57	+1.17	+0.33	+0.76	+0.43	−0.92	+0.10	−0.52	−0.78	−0.53	−0.06	71
July 9.....	+0.21	+0.90	+0.77	+0.58	+0.62	−0.47	−0.18	−0.16	−0.68	−0.36	+0.18	77
July 9.....	−0.42	+0.67	+0.41	+0.42	+0.27	−0.86	+0.11	−0.61	−0.71	−0.52	−0.12	78
Means	−0.26	+0.91	+0.50	+0.59	+0.44″	−0.75	+0.03	−0.43	−0.72	−0.47	−0.03	75

TABLE 17.

Diameter 33° 22′ — 213° 22′.

Circle E, Polaris S. P.

1886.	33° 22′.					213° 22′.					Error of diamet'r 33° 22′ 213° 22′.	Temp.
	M—N	O—P	P—M	N—O	Error of line 33° 22′.	M—N	O—P	P—M	N—O	Error of line 213° 22′.		
	″	″	″	″	″	″	″	″	″	′	″	°
July 4	—0.49	—1.58	—0.45	+0.03	—0.62	+1.24	+1.35	+0.82	+0.13	+0.88	+0.13	80
July 4	—0.43	—1.72	—0.46	—0.51	—0.78	+1.66	+0.79	+0.88	+0.42	+0.94	+0.08	83
July 5	—0.34	—1.52	—0.27	—0.01	—0.54	+2.30	+1.14	+0.80	+1.05	+1.32	+0.39	86
July 20	—0.69	—0.46	—0.32	—0.72	—0.55	+1.00	+0.61	+0.63	+0.84	+0.77	+0.11	76
Means	—0.49	—1.32	—0.38	—0.30	—0″.62	+1.55	+0.97	+0.78	+0.61	+0.98	+0″.18	82

TABLE 18.

Diameter 303° 22′ — 123° 22′.

Circle E. Polaris S. P.

1886.	303° 22′					123° 22′					Error of diameter 303° 22′–123° 22′	Temp.
	M—N	O—P	P—M	N—O	Error of line 303° 22′	M—N	O—P	P—M	N—O	Error of line 123° 22′		
	″	″	″	″	″	″	″	″	″	″	″	°
July 13	−1.20	+0.13	−0.26	+0.97	−0.09	−0.81	−0.65	−1.32	−1.59	−1.09	−0.59	71
July 15	−1.04	−0.08	−0.22	+0.13	−0.30	−0.88	−0.63	−1.10	−1.46	−1.02	−0.66	76
July 16	−1.01	−0.24	−0.64	+0.18	−0.43	−0.82	−0.97	−1.25	−1.35	−1.10	−0.76	80
Means	−1.08	−0.06	−0.37	+0.43	−0″.27	−0.84	−0.75	−1.22	−1.47	−1″.07	−0″.67	76

IV. THE LATITUDE OF THE WASHBURN OBSERVATORY.

By Mr. MILTON UPDEGRAFF.

LATITUDE FROM THE 303 STARS OBSERVED DURING THE YEARS 1884 AND 1885.

During the observation of the 303 stars for the Southern Zones of the *Astronomiche Gesellschaft* it was customary to observe the nadir immediately before and after each night's work. Intermediate determinations of the nadir were made when possible. It was expected that, by combination with observations of the fundamental stars of the 303 list, these nadirs would give a trustworthy determination of the latitude. This expectation has not been realized on account of the errors, both accidental and systematic, with which the results have been affected. The methods of observation and reduction are described in Vol. IV, *Publications of the Washburn Observatory* where the observations of the stars are printed. The results of these observations for latitude are given in the table below.

LATITUDE FROM THE 303 STAR OBSERVATIONS.

Date.	Observer	Circle	No. of Stars.	Seconds of Latitude.		Mean φ Circle West.	Mean φ Circle East.	Remarks.
				First Nadir.	Last Nadir.			
1884.				"	"	"	"	
May 2	H.	E.	11	34.09	35.72	.....	34.90	
8	H.	E.	10	36.43	35.98	.....	36.20	
10	H.	E.	21	35.24	35.09	.....	35.16	
13	H.	E.	22	36.17	36.07	.....	36.12	
19	H.	E.	16	36.35	35.29	.....	36.32	
26	H.	W.	7	37.42	37.20	37.31	.....	
27	H.	W.	9	37.18	37.57	37.38	.....	
28	H.	W.	9	37.09	37.13	37.12	.....	
30	H.	W.	12	38.24	37.26	37.80	.....	
June 3	H.	W.	13	36.99	36.79	36.89	.....	
5	C.	W.	17	36.99	37.03	37.01	.....	
6	C.	W.	19	35.43	36.61	36.02	.....	
7	C.	W.	17	37.68	36.99	37.34	.....	
12	C.	E.	6	35.36	35.55	.....	35.61	3 Nadirs.
13	C.	E.	6	.....	.....	.....	36.08	3 Nadirs.
14	C.	E.	6	.....	.....	.....	36.37	3 Nadirs.
21	C.	E.	23	36.03	35.23	.....	35.63	
July 9	C.	E.	13	37.73	35.10	.....	35.67	3 Nadirs.
10	C.	E.	20	35.22	35.55	.....	35.51	3 Nadirs.
12	C.	E.	26	34.14	35.68	.....	34.91	
13	C.	W.	11	37.49	37 40	37.33	.....	3 Nadirs.
18	C.	W.	10	37.00	37.56	37.28	.....	
25	C.	E.	14	34.43	35.66	.....	35.04	
26	C.	E.	15	37.28	35.58	.....	36.43	
27	C.	E.	12	35.25	36.27	.....	35.76	
30	C.	W.	17	36.27	35.97	36.12	.....	
31	C.	W.	19	38.35	36.02	37.18	.....	

LATITUDE FROM THE 303 STAR OBSERVATIONS — Continued.

Date.	Observer	Circle	No. of Stars.	Seconds of Latitude.		Mean φ Circle West.	Mean φ Circle East.	Remarks.
				First Nadir.	Last Nadir.			
1884.				"	"	"	"	
Sept. 8	C.	W.	17	37.02	37.50	37.26	.....	
9	C.	W.	16	37.69	37.98	37.84	.....	
12	C.	W.	14	34.54	37.57	36.06	.....	
19	C.	W.	16	35.70	37.16	36.43	.....	
24	C.	E.	14	32.30	35.33	.....	33.82	
Oct. 2	C.	E.	11	37.07	35.73	.....	36.40	
5	C.	W.	13	36.48	36.99	37.74	.....	
10	C.	W.	14	37.38	37.96	37.67	.....	
Nov. 6	H.	W.	18	36.84	37.16	36.75	.....	
7	H.	W.	27	36.70	36.87	36.78	.....	
13	H.	W.	20	36.46	35.72	36.09	.....	
15	H.	E.	16	34.68	35.71	.....	35.20	
18	H.	E.	22	31.84	37.09	.....	34.46	
20	H.	E.	19	33.57	35.49	.....	34.53	
27	H.	E.	17	35.58	35.93	.....	35.76	
30	H.	E.	7	35.07	34.24	.....	34.66	
Dec. 2	H.	E.	10	.....	.....	... .	35.33	
3	H.	E.	7	.....	.....	.....	35.26	
9	H.	E.	10	34.54	35.28	.....	34.91	
1885.								
Feb. 26	H.	E.	16	35.22	35.21	.....	35.22	
Mar. 8	C.	E.	8	.....	.....	.....	35.88	
9	C.	E.	7	36.48	36.62	.....	36.55	
10	C.	E.	8	.....	.....	.....	35.85	
11	C.	E.	8	.....	... .	.....	36.94	
19	C.	W.	8	.....	.....	37.18	.....	
20	C.	W.	8	37.26	37.90	37.58	.....	
21	H.	W.	9	36.90	37.54	37.22	.....	

LATITUDE FROM THE 303 STAR OBSERVATIONS —Continued.

Date.	Observer	Circle	No. of Stars.	Seconds of Latitude.		Mean φ Circle. West.	Mean φ Circle. East.	Remarks.
				First Nadir.	Last Nadir.			
1885.				"	"	"	"	
Mar. 22	C.	W.	8	36.88	37.78	37.33	.....	
24	C.	E.	8	.....	.....	.....	36.08	
28	H.	E.	16	35.85	35.67	.....	35.76	
Apr. 3	H.	E.	12	36.21	36.03	.....	36.12	
4	H.	E.	10	36.46	36.21	.....	36.34	
5	H.	W.	8	36.29	37.80	37.04	.....	
13	H.	W.	5	36.81	38.24	37.52	.....	
28	H.	W.	13	36.99	37.85	37.42	.....	
May 4	H.	W.	6	38.76	37.88	38.32	.....	
10	H.	W.	9	37.63	38.00	37.82	.....	
12	H.	W.	13	.....	.....	38.53	.....	
21	H.	E.	11	36.42	36.77	.....	36.47	3 Nadirs.
22	H.	E.	16	35.88	36.99	.....	36.44	
23	H.	E.	14	35.83	36.45	.....	36.14	
25	H.	W.	28	37.02	36.22	36.81	.....	3 Nadirs.
June 1	C.	E.	26	36.76	35.66	.....	36.44	8 Nadirs.
Oct. 29	U.	W.	12	36.87	36.36	36.62	.....	
Nov. 4	U.	W.	16	35.92	37.28	36.60	.....	
9	U.	W.	22	35.08	37.07	36.08	.....	
15	U.	W.	15	37.15	36.91	37.03	.....	
16	U.	E.	21	34.58	36.77	.....	35.68	
20	U.	E.	20	37.47	35.72	.....	36.60	
Dec. 1	U.	E.	9	34.62	35.89	.....	35.26	
2	U.	E.	12	34.53	36.04	.....	35.28	
18	U.	W.	18	35.36	36.19	35.78	.....	

LATITUDE FROM THE 303 STAR OBSERVATIONS — Continued.

Date.	Observer	Circle	No of Stars.	Seconds of Latitude.		Mean φ Circle West.	Mean φ Circle East.	Remarks.
				First Nadir.	Last Nadir.			
1885.				"	"	"	"	
19	U.	W.	10	36.55	37.79	37.17	.....	
25	U.	E.	9	36.13	35.62	.....	35.88	
Means..	.....	.....	.....	.....	.....	37".06	35".70	

$\frac{1}{2}$ (φ circle W. + φ circle E.) = 36".38.
φ circle W. — φ circle E = +1".37.

REDUCTION OF OBSERVATIONS OF FUNDAMENTAL STARS WITH THE MERIDIAN CIRCLE FOR LATITUDE, AND DISCUSSION OF THE ERRORS OF THE INSTRUMENT IN DECLINATION.

During the period occupied in observing the 303 stars, 92 observations of Polaris were made for latitude, by four observers, with the following result:

Mean circle W.	37".35.	(38)
Mean circle E.	36".30.	(54)
$\frac{1}{2}$ (φ circle W. + φ circle E)	36".82.	
φ circle W. — φ circle E.	+1".05.	

The difference, φ circle W. — φ circle E., is well marked in both series of observations, having the same sign in each case, and being larger for the southern stars which have, on the average, the greater zenith distances. The fundamental stars of the 303 list are rather evenly distributed over the zone 0° to —20°, the mean zenith distance being about 52°. The mean Z. D. of Polaris U. C. and L. C. is 47°.

According to the preceding investigation of the division errors of the nadir lines a large part of this difference, +0."74, is due to the division errors of the nadir. But there

still remains to be accounted for a difference W—E of +0″.3 for Polaris and +0.″7 for south stars.

A possible cause for this remaining discrepancy is the existence of an inquality of flexure of the telescope at equal distances north and south of the zenith, in the same position of the instrument.

Let h_1 be the correction for flexure which should be applied to the observed latitude from Polaris U. C. when the circle is West.

Let h_2 be the correction for flexure to the latitude from Polaris U. C. when the circle is East.

Then will $-h_2$ be the correction for flexure to the latitude from a South star at the same Z. D. as Polaris U. C. circle West.

Also $-h_1$ will be the correction for flexure for a South star at the same Z. D. as Polaris U. C. circle East.

If $\varphi =$ the latitude corrected for flexure and φ_1, φ_2, φ_3 and φ_4 the observed latitudes we have the following equations for Polaris after applying correction for division errors:

$$\text{Circle West, } \varphi = \varphi_1 + h_1.$$
$$\text{Circle East, } \varphi = \varphi_2 + h_2.$$
$$\text{W}-\text{E} = \varphi_1 - \varphi_2 = h_2 - h_1.$$

For south stars at same Z. D. as Polaris—

$$\text{Circle West, } \varphi = \varphi_3 - h_2.$$
$$\text{Circle East, } \varphi = \varphi_4 - h_1.$$
$$\text{W}-\text{E} = \varphi_3 - \varphi_4 = h_2 - h_1.$$

That is, the effect of difference of flexure in producing a difference, W — E is the same for Polaris as it is for south stars at the same zenith distance, and the same is true of any pair of stars of equal N. and S. zenith distances. h_1 and h_2 will be used hereafter to represent flexures at all zenith distances and we have in general:

$$\text{W}-\text{E} = h_2 - h_1. \qquad (1)$$

We have similarly, for difference of latitude derived from observations of North and South stars of equal zenith distance — Circle W. and Circle E.—

$$\text{S}-\text{N} = h_1 + h_2 \qquad (2)$$

W — E and S — N being found by observation, h_1 and h_2 may be found from equatons (1) and (2).

In the belief that if the flexure were eliminated the results for latitude would be more satisfactory, a series of pairs of stars was selected in November, 1886, from AUWER'S Fundamental Catalogue, the stars of each pair culminating at nearly equal distances North and South of the zenith. Care was taken to make the mean zenith distances of all the stars nearly equal to zero. Provision was made for the observation of the nadir point, once each hour as well as at the beginning and end of the night's work. The stars were observed three or four times in each position of the circle. The mean of the four latitudes derived from the stars of a pair in both positions of the circle should give a determination of the latitude from which the effect of flexure is eliminated as also is the error of the refraction tables, provided that the refraction is the same North as it is South of the zenith.

This latter assumption must be received with caution, since the southern shore of Lake Mendota, a sheet of water four miles wide, approaches within less than 1000 feet of the observatory. The lake was frozen during the latter half of the observations on this list of stars (Group II), and since most of the pairs culminate within 25° of the zenith, the effect of the lake upon the refraction is no doubt very small in this case. A similar list of stars (Group III) was observed in February and March, 1887, while the lake was frozen. Twenty-five pairs of stars, used for latitude, were observed in these two groups, 20 having a zenith distance of less than 40°, and five having a Z. D. of about 70°.

During these observations the runs of the microscopes were carefully watched and adjusted so that no appreciable error has crept in from this source. The periodic and progressive errors of the Z. D. micrometer screw have been found to be sufficiently small to be safely neglected. In the observation of the nadir, the observer was always North of the telescope and illuminating lamp South.

The following observations have been made to ascertain whether there exists a difference in the nadir point as determined Observer North Lamp South, and Observer South

Lamp North. Since no difference is indicated by these observations no correction of this sort has been applied.

Date.	Circle	Sid. Time.	Nadir.		Obs'r N Minus Obs'r S.	
			Observer N. Lamp S.	Observer S. Lamp N.		
1887.		h.	° ′ ″	° ′ ″	″	
April 10	E.	23.1	125 32 54.72	125 32 54.68	+0.04	
10	E.	23.4	54.74	54.89	—0.15	
10	E.	0.2	55.13	55.10	+0.03	
10	E.	0.4	55.12	54.93	+0.19	
11	E.	4.9	55.40	55.52	—0.12	
11	E.	5.2	55.21	55.52	—0.31	
11	E.	5.7	55.44	55.34	+0.10	
11	E.	5.8	55.42	55.47	—0.05	
11	E.	22.9	55.55	55.65	—0.10	
11	E.	23.1	55.78	55.79	—0.01	
12	W.	22.6	125 28 55.37	125 28 55.07	+0.30	
12	W.	22.7	54.81	54.91	—0.10	
13	W.	23.2	54.85	54.85	0.00	
13	W.	23.3	54.87	54.92	—0.05	
13	W.	0.1	55.28	55.26	+0.02	
13	W.	0.2	55.27	55.09	+0.18	
13	W.	1.1	55.13	54.95	+0.18	
13	W.	1.2	55.08	55.29	—0.21	
Mean..	.....	.....	.....	.....	—0″.003	±0″.024

Especial care was taken in the ventilation of the observing room. At no time did the internal and external temperature differ more than 5° and the average difference was 1°.5. Experience has proven that this matter is of the greatest importance in all observations of stars from the nadir with this instrument.

The apparent places of the fundamental stars used have been taken without correction from the *Berliner Jahrbuch* in case of those stars whose apparent places are there given. Otherwise the reduction to apparent place was computed and corrections for proper-motion applied as obtained from *Pub. Ast. Gesell.* No. XIV. The number of stars is sufficient to eliminate, for the most part, the accidental errors of the star-places, although several of the stars used are among those whose proper-motions in declination are among the more doubtful in the Fundamental Catalogue. The errors of division, too, must be practically eliminated, excepting the errors of the nadir lines.

In combining the observations circle W. and circle E., only the difference of the division errors of the nadir lines affects the latitude. This difference is small and has been carefully determined.

The observations were all made by Mr. M. UPDEGRAFF, the microscopes being read by Miss A. M. LAMB. The reductions were also made by them. The Pulkowa Refraction Tables were used. The nadirs for each night were plotted in a curve. By combination of the equatorial point for each star with the corresponding nadir point read from the curve a determination of the latitude was obtained. The means of all observations for latitude from each star were taken circle W. and circle E. separately, giving two values of the latitude. The mean of the four latitudes got from the two stars of a pair of nearly equal north and south zenith distances, gives a determination of the latitude from which flexure and the error of the refraction tables are practically eliminated.

On examining a series of observations made in the summer of 1885, to determine differentially the places of a list of zenith telescope stars, it was found that pairs could be selected from the B. J. stars used, in such a manner as to give a determination of the latitude according to the present plan. These observations, the results of which for latitude will be found in Group I, were made by two observers, G. C. C. and M. U. The method of observing was

TABLE 16.

Diameter 306° 0′—126° 0′.

Circle. E. Polaris U. C.

1886.	306° 0′					126° 0′					Error of diameter 306° 0′ 126° 0′.	Temp.
	M—N.	O—P.	P—M.	N—O.	Error of line 306° 0′.	M—N.	O—P.	P—M.	N—O.	Error of line 126° 0′.		
	″	″	″	″	″	″	″	″	″	″	″	°
July 8.....	−0.57	+1.17	+0.32	+0.76	+0.42	−0.92	+0.10	−0.52	−0.78	−0.53	−0.06	71
July 9.....	+0.21	+0.90	+0.77	+0.58	+0.62	−0.47	−0.18	−0.16	−0.68	−0.36	+0.13	77
July 9.....	−0.42	+0.67	+0.41	+0.42	+0.27	−0.86	+0.11	−0.61	−0.71	−0.52	−0.12	78
Means	−0.26	+0.91	+0.50	+0.59	+0.44″	−0.75	+0.03	−0.43	−0.72	−0.47	−0.02	75

TABLE 17.

Diameter 33° 22′ — 213° 22′.

Circle E, Polaris S. P.

1886.	33° 22′.					213° 22′.					Error of diamet'r 33° 22′ 213° 22′.	Temp.
	M—N	O—P	P—M	N—O	Error of line 33° 22′.	M—N	O—P	P—M	N—O	Error of line 213° 22′.		
	″	″	″	″	″	″	″	″	″	′	″	°
July 4	—0.49	—1.58	—0.45	+0.03	—0.62	+1.24	+1.35	+0.82	+0.13	+0.88	+0.13	80
July 4	—0.43	—1.72	—0.46	—0.51	—0.78	+1.66	+0.79	+0.88	+0.42	+0.94	+0.08	83
July 5	—0.34	—1.52	—0.27	—0.01	—0.54	+2.30	+1.14	+0.80	+1.05	+1.32	+0.39	86
July 20	—0.69	—0.46	—0.32	—0.72	—0.55	+1.00	+0.61	+0.63	+0.84	+0.77	+0.11	76
Means	—0.49	—1.32	—0.38	—0.30	—0″.62	+1.55	+0.97	+0.78	+0.61	+0.98	+0″.18	82

GROUP II.

Observed during November and December, 1886. Observer M. U.

Stars North of Zenith.

STARS.	R. A.	Z. D.	Mean φ circle West.	Mean φ circle East.	φ circle W minus φ circle E.
	h. m.	° ′	″	″	″
g Cygni.....	21 25	— 2 58	36.65	35.97	+0.68
π^3 Cygni.....	21 42	— 5 43	36.75	35.68	+1.07
7 Lacertae.....	22 36	— 6 38	37.00	35.13	+1.87
8 Lacertae.....	22 19	— 8 35	37.27	35.15	+2.12
ζ Cassiop.....	0 30	—10 12	36.90	35.85	+1.05
BR. 3077.....	23 7	—13 28	36.63	35.83	+0.80
ρ Cassiop.....	23 48	—13 47	36.07	35.70	+0.37
ι Cephei.....	22 45	—22 32	36.83	35.03	+1.80
β Cephei.....	21 27	—26 59	37.30	34.95	+2.35
Bradley 6.....	0 9	—33 14	37.10	35.62	+1.48
3 Draco. S. P.....	23 36	—69 31	36.23	36.98	—0.75
Gr. 1771 S. P.....	23 16	—71 56	36.57	35.98	+0.59
76 Urs. Maj. S. P...	0 36	—73 32	37.03	37.25	—0.22
Means.....	.....	—27 37	36.79	35.78	+1.02
			36″.29		

Stars South of Zenith.

	h. m.	° ′	″	″	″
13 Lacertae.....	22 39	+ 1 51	36.93	35.67	+1.26
74 Cygni.....	21 32	+ 3 10	36.85	35.83	+1.02
μ Androm.....	0 50	+ 5 11	38.27	37.12	+1.15
δ Androm.....	0 33	+12 50	38.13	37.08	+1.05
η Pegasi.....	22 37	+13 26	38.27	36.93	+1.34
α Androm.....	0 2	+14 36	38.33	37.35	+0.98
16 Pegasi.....	21 47	+17 40	37.75	36.65	+1.10
φ Pegasi.....	23 46	+24 35	38.47	36.90	+1.57
α Pegasi.....	22 59	+28 28	38.60	37.07	+1.53
ε Piscium.....	0 57	+35 47	38.10	37.20	+0.90
c^2 Aquarii.....	23 3	+64 50	37.97	36.10	+1.87
δ Sculptoris.....	23 43	+71 47	38.73	37.05	+1.68
α Pis. Aust.....	22 51	+73 15	37.03	36.10	+0.93
Means.....		+28 16	37.96	36.70	+1.26
			37″.33		

GROUP III.

Observed during February and March, 1887. *Observer M. U.*

Stars North of Zenith.

Star.	R. A.	Z. D.	Mean φ circle West.	Mean φ circle East.	φ circle W minus φ circle E.
	h. m.	° ′	″	″	″
β Aurigae	5 51	— 1 51	36.70	34.80	+1.90
α Aurigae	5 8	— 2 48	36.53	36.80	—0.27
o Aurigae	5 37	— 6 42	36.53	34.90	+1.63
15 Lyncis	6 47	—15 29	36.90	35.87	+1.03
10 Camel	4 53	—17 12	36.37	35.40	+0.97
43 Camel	6 42	—25 56	37.95	35.57	+2.38
22 Camel	6 6	—26 16	36.73	34.57	+2.16
Gr. 966	5 25	—31 53	36.20	34.20	+2.00
19 H. Camel	5 4	—36 1	36.43	35.95	+0.48
23 H. Camel	6 27	—36 36	36.73	35.27	+1.46
f Draco. S. P.	5 32	—68 41	37.20	36.10	+1.10
δ Draco. S. P.	7 13	—69 25	36.60	36.33	+0.27
Means	.....	—28 14	36.74	35.48	+1.26
			36″.11		

Stars South of Zenith.

	m. h.	° ′	″	″	″
ν Aurigae	5 44	+ 8 58	37.47	36.60	+0.87
u Aurigae	5 6	+ 4 44	37.67	37.10	+0.57
ι Aurigae	4 50	+10 5	38.10	37.10	+1.00
α Geminorum	7 27	+10 56	37.70	36.87	+0.83
η Geminorum	6 8	+20 32	38.43	37.30	+1.13
ζ Geminorum	6 57	+22 20	37.40	36.90	+0.50
γ Geminorum	6 31	+26 35	38.53	36.47	+2.06
φ^1 Orionis	5 29	+33 39	37.87	37.43	+0.44
α Orionis	5 49	+35 41	38.90	37.03	+1.87
8 Monocerotis	6 18	+38 25	37.33	37.30	+0.03
ε Leporis	5 1	+65 34	36.50	38.10	—1.60
ε Canis Maj	6 54	+71 51	36.00	37.20	—1.20
Means	.....	+28 42	37.66	37.12	+0.54
			37″.39		

The latitude from—

Group I	= 43° 4′ 36″.81	12 pairs.
Group II	= 43 4 36 .81	13 pairs.
Group III	= 43 4 36 .75	13 pairs.

φ Circle W. minus φ Circle E. is for—

	North Stars.	South Stars.
Group I	+0″.41	+0″.67.
Group II	+1 .02	+1 .26.
Group III	+1 .26	+0 .54.
Means	+0″.90	+0″.84.

Latitude from N. stars minus latitude from S. stars is for—

	Circle W.	Circle E.
Group I	−0″.69	−0″.43.
Group II	−1 .17	−0 .93.
Group III	−0 .92	−1 .64.
Means	−0″.93	−1″.00.

The differences φ circle W. — φ circle E. and N. —S. are smaller in case of Group I, than in case of Groups II and III. More observations are necessary to determine whether this change has taken place with the time or the temperature.

From those stars of Group I which have a less zenith distance than 23°, after applying division errors of the Nadir lines—

$$W - E = -0''.20 \pm 0''.06.$$
$$S - N = +0''.71 \pm 0''.07.$$

With these values we find from equations (1) and (2), page 60:

$$h_1 = +0''.46 \pm 0''.05 \qquad h_2 = +0''.26 \pm 0''.05.$$

The 18 stars used are quite evenly distributed in zenith distance from 3° to 23° and the mean Z. D. without regard to sign is 12°.2. Therefore the *mean* correction for flexure to be applied to the observed latitude from stars within these limits of zenith distance was at the time these observations were made—

	North Stars.	South Stars.
Circle W.	+0″.46 ± 0″.05	−0″.26 ± 0″.05.
Circle E.	+0″.26 ± 0″.05	−0″.46 ± 0″.05.

Groups II and III have been treated as one since they were observed during the same winter and from those stars of Groups II and III which have a less Z. D. than 40° we have, as above, after applying the division errors of the nadir lines —

$$W-E=+0''.47\pm0.06 \qquad S-N=+1''.33\pm0.08.$$

Then —

$$h_1 = +\ 0''.43\pm0''.05 \qquad h_2=+0''.90\pm0''.05.$$

The zenith distances of the stars used are all between 1° and 39°, and the mean Z. D. without regard to sign is 17°.7. Therefore the mean correction for flexure to be applied to the observed latitude from stars within these limits of zenith distance is, for the time and temperature at which the observations were made—

	North Stars.	South Stars.
Circle W.	$+0''.43\pm0''.05$	$-0''.90\pm0''.05$
Circle E.	$+0\ .90\pm0\ .05$	$-0\ .43\pm0\ .05$

The stars of groups II and III have been divided into seven groups and the flexures derived in order to show the flexures at the different zenith distances.

	h_1	h_2	Number of Stars.
0°—10°	$+0''.27\pm0''.10$	$+0''.66\pm0''.10$	14
10 —20	$+0\ .57\pm0\ .07$	$+0\ .78\pm0\ .07$	10
20 —30	$+0\ .23\pm0\ .11$	$+1\ .26\pm0\ .11$	8
30 —40	$+0\ .68\pm0\ .12$	$+1\ .04\pm0\ .12$	8
40 —55	$+0\ .32\pm0\ .07$	$+1\ .12\pm0\ .07$	8
55 —65	$-0\ .02\pm0\ .15$	$+0\ .55\pm0\ .15$	8
65 —75	$+0\ .47\pm0\ .18$	$-0\ .01\pm0\ .18$	10

The values of the flexure for zenith distances 0°—40° are derived from North and South stars used for latitude and are probably as reliable as is indicated by the probable errors. From 40° to 65° the flexures depend on six south stars only, and cannot be considered to be as well determined as the probable errors would indicate. The results for flexure from 65°—75° are not very accordant, as is indicated by the large probable error. However, as will be seen later, these

stars give good values of the latitude and the apparent diminution of the flexure near the horizon is no doubt real —the results from 65°—75° agreeing with our determinations of the horizontal flexure from opposing collimators, see page 27. It should be borne in mind, however, that what is spoken of as "flexure" in this discussion includes not only the flexure of the telescope but that of the divided circle, the error of the Pulkowa Refraction Tables for this observatory, and, probably, other sources of error.

By the observation of a sufficient number of stars at all declinations an accurate series of corrections for flexure may be obtained. By an application of the above corrections for flexure to several nights' work in declination between a North and South Z. D. of 40° the mean probable error of a single determination of the equatorial point was reduced from ±0″.62 without the correction for flexure, to ±0″.38 after the correction was applied.

The result of a series of observations on a similar list of stars in right ascension would be valuable, but would be more influenced by personal equation than observations in declination.

Below are given the separate results for latitude from each pair of stars included in Groups I, II and III. The latitude from ψ^5 Aurigæ, a star observed very near the zenith, is included.

Stars.	R. A.	Z. D.	Mean φ circle West.	Mean φ circle East.	$\frac{W+E}{2}$	Seconds of Latitude.
	h. m.	° ′	″	″	″	″
ψ^5 Aurigae	6 39	— 0 37	37.30	36.27	36.78	36.78
g Cygni.....	21 25	— 2 58	36.65	35.97	36.31	36.30
13 Lacertae	22 39	+ 1 51	36.93	35.67	36.30	
β Aurigae	5 51	— 1 51	36.70	34.80	35.75	36.39
ν Aurigae	5 44	+ 3 58	37.47	36.60	37.04	
o^1 Cygni	20 10	— 3 19	36.50	36.22	36.36	36.76
γ Cygni	20 18	+ 3 11	37.65	36.67	37.16	
α Aurigae	5 8	— 2 48	36.53	36.80	36.66	37.02
μ Aurigae	5 6	+ 4 44	37.67	37.10	37.34	
π^2 Cygni.....	21 42	— 5 43	36.75	35.68	36.22	36.28
74 Cygni.....	21 32	+ 3 10	36.85	35.83	36.34	
ε Herculis.....	17 36	— 3 0	37.25	36.64	36.94	37.02
π Herculis.....	17 11	+ 6 8	37.55	36.63	37.09	
ϑ Cygni	19 33	— 6 53	36.54	36.17	36.36	36.91
15 Cygni.....	19 40	+ 6 0	37.94	37.00	37.47	
7 Lacertae	22 36	— 6 38	37.00	35.13	36.06	36.88
μ Andromedae.	0 50	+ 5 11	38.27	37.12	37.70	
o Aurigae.....	5 37	— 6 42	36.53	34.90	35.72	36.66
ε Aurigae.....	4 50	+10 5	38.10	37.10	37.60	
β Draconis	17 28	— 9 19	36.82	36.23	36.52	37.24
β Lyrae.....	18 46	+ 9 51	38.30	37.62	37.96	
3 Lacertae	22 19	— 8 35	37.27	35.15	36.21	36.91
δ Andromedae .	0 33	+12 50	38.13	37.08	37.60	

Star.	R. A.	Z. D.	Mean φ circle West.	Mean φ circle East.	$\frac{W+E}{2}$	Seconds of Latitude.
	h. m.	° ′	″	″	″	″
ζ Cassiopeiae ..	0 30	−10 12	36.90	35.85	36.38	36.99
η Pegasi.....	22 37	+13 26	38.27	36.93	37.60	
ν^1Draconis	17 30	−12 11	36.60	36.25	36.42	36.50
ζ Cygni	21 8	+13 19	37.34	35.83	36.58	
15 Lyncis	6 47	−15 29	36.90	35.87	36.38	36.84
α Geminorum..	7 27	+10 56	37.76	36.87	37.28	
ξ Draconis.....	17 52	−13 49	36.93	36.12	36.52	36.82
ξ Herculis.....	17 53	+13 49	37.34	36.90	37.12	
Br. 3077.....	23 7	−13 28	36.63	35.83	36.23	37.04
α Andromedae .	0 2	+14 36	38.33	37.35	37.84	
ρ Cassiopeiae...	23 48	−13 47	36.07	35.70	35.88	36.54
16 Pegasi.....	21 47	+17 40	37.75	36.65	37.29	
b Draconis	18 22	−15 39	36.29	36.20	36.24	36.68
μ Herculis.	17 42	+15 17	37.29	36.96	37.12	
10 Camel.....	4 53	−17 12	36.37	35.40	35.88	36.88
η Geminorum..	6 8	+20 32	38.43	37.30	37.86	
36 Draconis	18 13	−21 17	36.29	36.22	36.26	36.56
109 Herculis....	18 19	+21 21	37.01	36.74	36.88	
ζ Draconis.....	17 8	−22 47	36.58	36.10	36.34	36.66
110 Herculis....	18 41	+22 38	36.98	37.00	36.99	
ι Cephei.... ..	22 45	−22 32	36.83	35.03	35.93	36.81
φ Pegasi	23 46	+24 34	38.47	36.90	37.68	
43 Camel.	6 42	−25 56	37.95	35.57	36.76	36.96
ζ Geminorum ..	6 57	+22 20	37.40	36.90	37.15	

Star.	R. A.	Z. D.	Mean φ circle West.	Mean φ circle East.	$\frac{W+E}{2}$	Seconds of Latitude.
	h. m.	° ′	″	″	″	″
22 Camel	6 6	—26 16	36.73	34.57	35.65	36.58
γ Geminorum..	6 31	+26 35	38.53	36.47	37.50	
β Cephei.....	21 27	—26 59	37.30	34.95	36.12	36.98
α Pegasi	22 59	+28 28	38.60	37.07	37.84	
Gr. 966.....	5 25	—31 53	36.20	34.20	35.20	36.42
φ Orionis	5 29	+33 39	37.87	37.43	37.65	
Bradley 6	0 9	—33 14	37.10	35.62	36.36	37.00
ε Piscium.....	0 57	+35 47	38.10	37.20	37.65	
19 H. Camel ...	5 4	—36 1	36.43	35.95	36.19	37.08
α Orionis	5 49	+35 41	38.90	37.03	37.96	
23 H. Camel....	6 27	—36 36	36.73	35.27	36.00	36.66
8 Monocerotis..	6 18	+38 25	37.33	37.30	37.32	
76 Draconis....	20 51	—39 1	36.72	36.23	36.50	37.04
θ Serpentis.....	18 50	+39 0	37.70	37.50	37.60	
Gr. 966 S. P	17 24	—61 56	37.60	37.10	37.35	36.97
υ Capricorni ...	20 33	+61 35	37.35	35.82	36.58	
f Draconis S. P.	5 32	—68 41	37.20	36.10	36.65	36.98
ε Leporis	5 1	+65 34	36.50	38.10	37.30	
3 Draconis S. P.	23 36	—69 31	36.23	36.98	36.60	36.82
c^2 Aquarii.....	23 3	+64 50	37.97	36.10	37.04	
δ Draconis S. P.	7 13	—69 25	36.60	36.33	36.46	36.53
ε Canis Maj ...	6 54	+71 51	36.00	37.20	36.60	
Gr. 1771 S. P...	23 16	—71 56	36.57	35.98	36.28	37.08
δ Sculptoris....	23 43	+71 47	38.73	37.05	37.89	

STARS.	R. A.	Z. D.	Mean φ circle West.	Mean φ circle East.	$\frac{W+E}{2}$	Seconds of Latitude.
	h. m.	° ′	″	″	″	″
76. Urs. Maj. S.P.	0 36	—73 32	37.03	37.25	37.14	36.85
α Pis. Aust....	23 51	+73 15	37.03	36.10	36.56	
17 Camel S. P..	17 19	—73 54	36.64	36.38	36.51	36.50
γ Sagittarii....	17 58	+73 27	36.64	36.35	36.50	
Means.....	.....	+ 0 14	37.221	36.354	36.79	36.787

Mean Z. D. of stars North of zenith = —26° 31′.
Mean Z. D. of stars South of zenith = +26° 58′.
Mean Z. D. of all = +0° 14′.

The mean of the 38 pairs is 36″.787 ± 0″.026. All have been given equal weight excepting ψ^5 Aurigæ, which is given weight one-half. The only correction to be applied to this result is that for difference of division errors of the nadir lines. This correction is, —0.″010 ± 0″.014 (see page 35), which being applied, notwithstanding the relatively large probable error, gives as the latitude of the meridian circle, resulting from this discussion:

43° 4′ 36″.78 ± 0″.030.

The means have been taken for each ten degrees of zenith distance as given below:

0°— 10°	36″.75	11 pairs.
10 — 20	36 .80	9 pairs.
20 — 30	36 .73	6 pairs.
30 — 40	36 .84	5 pairs.
60 — 75	36 .82	7 pairs.

No variation is indicated in the latitude as derived from the various zenith distances. However it is intended to secure observations of pairs whose zenith distances are from 40° to 60°.

Those zenith telescope determinations of the latitude in which only fundamental stars have been used, give

$$43^\circ\ 4'\ 36''.97 \pm 0''.07.$$

The result of a series of prime vertical transits gives:

$$43^\circ\ 4'\ 36''.99 \pm 0''.06.$$

See Vol. III, *Publications of the Washburn Observatory.*

The latitude, as determined by the U. S. C. and G. Survey, in 1873, is

$$43^\circ\ 4'\ 36''.64 \pm 0''.10.$$

The same stars were reobserved here by the U. S. C. and G. Survey in 1885, but the observations have not yet been reduced. A letter from Mr. B. A. COLONNA, assistant in charge of the U. S. C. and G. Survey office, informs us that these reductions are to be made at once.

OBSERVATIONS OF POLARIS FOR LATITUDE.

The observations for Polaris for latitude have been continued. They indicate considerable instrumental change by comparison with the Polaris observations of 1884–5. The means have been taken and corrections for division errors applied.

OBSERVATIONS OF POLARIS.

M. U., OBSERVER.

Circle W.

Date.	Day or Night.	Nadirs.		Temp.	Wt.	Seconds of Latitude.		Remarks.
		First.	Second.			U. C.	L. C.	
1885.		′	″			″	″	
Oct. 28	Night.	30.73	30.77	+36	4	36.54	.....	
1886.								
April 5	Day ..	19.33	19.15	+34	4	36.79	.....	
April 8	Day ..	8.12	8.16	+44	3	37.47	.....	
April 16	Day ..	51.60	51.28	+63	3	35.75	.....	Lake just breaking up.
May 15	Day ..	32.75	32.53	+48	5-2	36.94	.....	
May 27	Day ..	44.96	45.30	+68	3	37.33	.....	
May 29	Night.	46.49	46.37	+71	4	.....	36.35	
May 20	Day ..	46.26	46.37	+64	.....	36.49		
June 3	Night.	45.39	45.69	+62	3	.....	36.23	
Oct. 18	Day ..	6.12	6.07	+67	4	.....	35.73	
Oct. 26	Night.	6.91	6.41	+36	3	34.80	.....	
Oct. 28	Day ..	6.70	6.42	+46	5	.....	35.31	
Oct. 29	Night.	7.28	7.26	+44	2-3	34.36	.....	
Oct. 29	Day ..	6.42	6.41	+53	3	.....	36.15	
Oct. 30	Night.	6.78	6.88	+44	4	34.74	.....	
Oct. 30	Day ..	6.71	6.76	+58	4	.....	35.58	
Dec. 14	Day ..	59.82	60.15	+ 2	3	.....	35.54	
Dec. 15	Day ..	0.85	1.05	— 5	3	.....	35.25	
1887.								
Feb. 16	Day ..	1.40	1.38	+32	5	36.51	.....	
Means	.....	....	.....	.....	.....	36.16	35.77	
Means	corrected for division errors				.....	35.84	35.19	

OBSERVATIONS OF POLARIS.

M. U., OBSERVER.

Circle E.

Date.	Day or Night.	Nadirs.		Temp.	Wt.	Seconds of Latitude.		Remarks.
		First.	Second.			U. C.	L. C.	
1886.		"	"	°		"	"	
Aug. 1	Day ..	6.42	.....	+80	4	.....	36.87	
Aug. 7	Day ..	5.51	5.41	+78	3	.....	37.33	
Aug. 24	Day ..	4.61	4.93	+78	1	... .	36.97	
Aug. 25	Day ..	5.15	4.97	+78	2	... .	36.66	
Aug. 26	Day ..	4.22	4.19	+86	3	.....	37.09	
Sept. 14	Day ..	8.35	7.92	+64	3	.....	37.04	
Sept. 15	Day ..	6.57	6.57	+76	3-4	.....	36.80	
Sept. 23	Day ..	4.10	4.13	+77	4-3	.....	36.75	
Nov. 2	Day ..	10.26	10.67	+49	2	.....	35.79	
Nov. 3	Night.	10.94	10.92	+39	2	35.88	.....	
Nov. 4	Night.	11.86	11.72	+52	4	36.23	.....	
Nov. 5	Day ..	14.00	14.07	+32	4	.....	35.62	
Nov. 6	Day ..	15.00	.....	+26	3	.....	35.15	
Nov. 7	Night.	13.94	14.08	+25	3	35.39	.....	
Nov. 12	Night.	10.77	10.83	+28	1	35.37	.....	
Nov. 13	Day ..	11.15	10.56	+37	5	.....	36.51	
Nov. 21	Night.	4.26	4.31	+34	4-5	35.73	.....	
Nov. 26	Night.	6.64	6.91	+18	3	35.85	.....	
Means.	.....	.....	.....	.....	.....	35.74	36.55	
Means	correct	ed for	divisio	n er	rors.	36.19	36.67	

OBSERVATIONS OF POLARIS.

A. M. L., OBSERVER.

Circle E.

Date.	Day or Night.	Nadirs.		Temp.	Wt.	Seconds of Latitude.		Remarks.
		First.	Second.			U. C.	L. C.	
1886.		′	′	°		′	′	
Aug. 2	Day ..	6.23	6.80	+74	4	.....	35.71	
Aug. 30	Day ..	5.51	5.55	+67	2	.....	35.81	
Sept. 4	Day ..	5.32	4.98	+82	3	.....	36.52	
Sept. 6	Day ..	4.07	4.10	+85	3	.....	36.45	
Sept. 7	Day ..	5.15	5.18	+85	3	.....	35.68	
Sept. 10	Day ..	.....	5.81	+65	3	.....	36.61	
Oct. 2	Day ..	7.49	7.62	+54	3–2	.....	37.94	
Oct. 4	Day ..	6.38	6.50	+64	4	.....	37.12	
Oct. 6	Day ..	5.82	5.71	+64	3	.....	37.94	
Nov. 6	Night.	13.61	13.62	+25	3–4	35.66	.....	
Nov. 7	Day ..	14.53	15.01	+33	2	.....	36.76	
Nov. 8	Night.	14.12	13.79	+38	4	35.83	.....	
Nov. 10	Day ..	10.78	11.16	+30	4	.....	36.49	
Nov. 11	Night.	11.31	11.27	+29	4	35.70	.....	
Nov. 11	Day ..	11.43	11.37	+30	4	.....	36.44	
Nov. 12	Day ..	11.55	11.61	+28	4	.....	36.60	
Nov. 13	Night.	10.73	10.58	+28	2	36.67	.....	
Nov. 14	Day ..	10.07	10.26	+34	3	.....	36.22	
Nov. 15	Night.	9.81	9.97	+31	5	36.52	.....	
Nov. 18	Day ..	6.63	7.05	+20	1	.....	36.52	
Nov. 19	Day ..	4.60	4.70	+29	2	....	37.82	
Nov. 28	Day ..	3.07	3.83	+11	4	.....	36.15	
Nov. 30	Day ..	.....	5.34	— 1	4	.....	35.55	
Dec. 4	Night.	5.69	4.76	+ 6	3–4	35.91	.....	
Dec. 6	Night.	2.88	2.81	+20	5	36.54	.....	
Means	.....	.....	.....	.....	.....	36.12	36.57	
Means	correct	ed for	divisio	n err	ors.	36.57	36.69	

OBSERVATIONS OF POLARIS.

A. M. L., OBSERVER.

Circle W.

Date.	Day or Night.	Nadirs.		Temp.	Wt.	Seconds of Latitude.		Remarks.
		First.	Second.			U. C.	L. C.	
1886.		"	"	°		"	"	
Apr. 18	Day...	49.59	49.61	+68	3	36.68	.....	
Apr. 21	Day...	49.55	49.44	+72	3-4	36.54	.....	
May 6	Day...	41.26	.....	+49	2-3	36.81	.....	
May 16	Day...	32.78	32.13	+55	3	36.89	.....	
May 18	Day...	30.48	30.59	+64	4	36.64	.....	
May 19	Day...	22.60	23.00	+59	3	35.61	.....	
May 21	Day...	43.38	43.81	+70	1-2	36.66	.....	
May 23	Day...	44.17	43.95	+61	2	35.67	.....	
May 25	Day...	44.66	44.98	+63	2	36.09	.....	
July 26	Day...	58.37	58.45	+82	3	.....	36.77	
Oct. 7	Day...	57.38	.....	+71	3	.....	37.31	
Oct. 8	Day...	3.09	3.67	+74	4	.....	37.52	
Oct. 17	Day...	6.15	7.12	+51	2	.....	36.65	
Oct. 20	Day...	6.01	6.00	+56	4-5	.....	35.09	
Oct. 21	Day...	6.62	5.92	+60	3	.....	36.25	
Oct. 26	Day...	6.04	6.18	+40	4	.....	36.09	
Oct. 27	Night..	6.10	6.58	+38	3	34.80	.....	
Oct. 27	Day...	5.82	5.83	+44	5	.....	35.39	
Oct. 28	Night..	6.24	6.70	+42	3-4	34.71	.....	
Dec. 8	Night..	59.22	59.32	+27	4	36.53	.....	
Dec. 20	Night..	1.70	1.06	+28	3	36.87	.....	
1887.								
Feb. 8	Night..	4.47	4.49	+22	3	35.75	.....	
Means	.....	.....	.....	.....	.....	36.16	36.38	
Means	corrected for division errors					35.84	35.80	

V. OBSERVATIONS IN DECLINATION MADE WITH THE MERIDIAN CIRCLE FRON NOVEMBER 26, 1886, TO MARCH 10, 1887.

These observations have been made upon two classes of stars: (1) Stars of AUWER'S Fundamental Catalogue. (2) Stars observed for the determination of the refraction, and which are being observed also at Leyden and the Cape of Good Hope. A few stars occur in both classes.

The purposes for which the fundamental stars were observed and the methods used are explained in chapter IV. The observations have been reduced differentially and no corrections for flexure or division error have been applied. They are therefore entirely comparable with the meridian circle observations which are published in Vol. IV, *Publications of the Washburn Observatory.*

α Andromedae.

1886.							
Nov. 26,	0	2	30	+28	27	38.8	E
Dec. 3,						38.2	E
4,						39.0	E
6,						39.0	E
8,						38.8	W
9,						38.7	W
20,						38.1	W

κ² Sculptoris.

1886.							
Nov. 26,	0	5	45	—28	26	5.3	E
Dec. 3,						6.4	E
4,						5.2	E
6,						5.6	E
8,						6.6	W
9						5.4	W
29,						7.0	W

BR. 6.

1886.							
Nov. 26,	0	9	46	+76	19	2.8	E
Dec. 3,						2.6	E
4,						2.3	E
6,						1.7	E
8,						1.9	W
9,						2.7	W
20,						1.4	W

ι Ceti.

1886.							
Dec. 3,	0	13	37	— 9	27	22.0	E
4,						22.0	E
6,						22.4	E
8,						22.2	W
9,						23.6	W
20,						22.0	W

ι Sculptoris.

1886.							
Nov. 26,	0	15	47	—29	36	43.6	E
Dec. 3,						42.3	E
4,						43.2	E
6,						44.6	E
8,						43.8	W
9,						44.0	W
20,						44.4	W

ζ Cassiopeiae.

1886.							
Nov. 26,	0	30	37	+53	16	10.9	E
Dec. 3,						9.3	E
4,						10.8	E
6,						10.6	E
8,						10.8	W
9,						10.1	W
20,						9.8	W

δ Andromedae.

1886.							
Nov. 26,	0	33	14	+30	14	12.6	E
Dec. 3,						13.3	E
4,						12.9	E
6,						12.4	E
8,						13.9	W
9,						12.6	W
20,						12.9	W

ο Cassiopeiae.

1886.							
Nov. 26,	0	38	22	+47	39	37.5	E
Dec. 3,						37.3	E
4,						37.4	E
6,						37.4	E
8,						37.1	W
9,						37.0	W
20,						37.1	W

ν Cassiopeiae.

1886.							
Nov. 26,	0	42	22	+50	20	45.9	E
Dec. 3,						46.9	E
4,						46.5	E
6,						47.2	E
8,						46.7	W
9,						47.1	W
20,						46.9	W

μ Andromedae.

1886.						
Nov. 26,	0	50	26	+37	52	50.3	E
Dec. 3,						50.4	E
4,						50.6	E
6,						50.3	E
8,						49.5	W
9,						50.4	W
20,						51.0	W

α Sculptoris.

1886.						
Nov. 26,	0	53	7	−29	58	24.9	E
Dec. 3,						25.9	E
4,						25.5	E
6,						26.0	E
9,						26.4	W
20,						26.1	W

ε Piscium.

1886.						
Dec. 8,	0	57	2	+7	16	34.4	E
4,						33.2	E
6,						33.3	E
8,						33.8	W
9,						33.5	W
20,						34.4	W

υ Persei.

1886.						
Dec. 21,	1	31	0	+48	3	0.6	W
22,						2.2	W

φ Persei.

1886.						
Dec. 21,	1	36	31	+50	6	51.0	W
22,						50.6	W

τ Ceti.

1886.						
Dec. 21,	1	38	46	−16	32	17.6	W
22,						18.1	W

LAC. *ε Sculptoris.*

1886.						
Dec. 21,	1	40	18	−25	37	23.6	W
22,						22.2	W

α Trianguli.

1886.						
Dec. 21,	1	46	35	+29	1	22.0	W
22,						21.4	W

β Arietis.

1886.							
Dec. 21,	1	48	21	+20	14	60.9	W
22,						59.6	W

υ Ceti.

1886.							
Dec. 21,	1	54	38	−21	37	49.8	W
22,						50.1	W

γ Andromedae.

1886.							
Dec. 21,	1	56	54	+41	46	54.9	W
22,						55.9	W

55 *Cassiopeiae.*

1886.							
Dec. 21,	2	5	33	+65	59	22.1	W
22,						21.7	W

Lac. *μ Fornacis.*

1886.							
Dec. 21,	2	7	53	−31	15	32.3	W
22,						32.0	W

ξ^2 *Ceti.*

1886.							
Dec. 21,	2	22	6	+7	56	52.9	W
22,						53.8	W

36. Hev. *Cassiopeiae.*

1886.							
Dec. 21,	2	27	13	+72	19	8.5	W
22,						7.4	W

ν Arietis.

1886.							
Dec. 21,	2	32	21	+21	28	4.2	W
22,						3.9	W

ϑ Persei.

1886.							
Dec. 21,	2	36	25	+48	44	43.0	W
22,						44.5	W

π Ceti.

1886.							
Dec. 21,	2	38	42	−14	20	32.0	W
22,						31.3	W

Fornacis.

1886.							
Dec.	21,	2	44	22	−32	53	6.3	W
	22,						5.3	W

τ Persei.

1886.							
Dec.	21,	2	46	11	+52	17	43.5	W
	22,						43.6	W

47 H. *Cephei.*

1886.							
Dec.	21,	2	50	58	+78	57	59.4	W
	22,						59.6	W

α Ceti.

1886.							
Dec.	21,	2	56	19	+3	38	50.7	W
	22,						51.2	W

β Persei.

1886.							
Dec.	21,	3	0	45	+40	30	56.2	W
	22,						57.0	W

δ Arietis.

1886.							
Dec.	21,	3	5	7	+19	17	40.9	W
	22,						40.9	W

12 *Eridani.*

1886.							
Dec.	21,	3	7	14	−29	26	13.4	W
	22,						13.5	W

α Persei.

1886.							
Dec.	21,	3	16	11	+49	27	16.8	W
	22,						16.8	W

2 H *Camelopardalis.*

1886.							
Dec.	21,	3	19	51	+59	32	32.5	W
	22,						31.1	W

ι Aurigae.

1887.							
Feb.	8,	4	49	38	+32	59	9.1	W
	9,						9.5	W
	15,						9.2	W
	16,						9.0	W
Mar.	1,						9.3	E

10 *Camelopardalis.*

1887.							
Feb.	8,	4	53	22	+60	16	32.4	W
	9,						32.8	W
	15,						33.1	W
	16,						32.7	W
	28,						35.5	E
Mar.	1,						32.8	E

LL. 9542.

1887.							
Feb.	8,	4	57	34	−26	26	8.6	W
	9,						11.0	W
	15,						9.2	W
	16,						8.8	W
	28,						9.8	E
Mar.	1,						12.5	E

ε *Leporis.*

1887.							
Feb.	8,	5	0	41	−22	31	25.4	W
	9,						24.6	W
	15,						25.2	W
	16,						24.7	W
	28,						26.1	E
Mar.	1,						26.8	E

19 H *Camelopardalis.*

1887.							
Feb.	8,	5	3	57	+79	6	55.6	W
	9,						56.2	W
	15,						55.8	W
	16,						55.6	W
	28,						56.8	E
Mar.	1,						55.8	E

μ *Aurigae.*

1887.							
Feb.	8,	5	5	42	+38	20	57.6	W
	9,						57.7	W
	15,						58.0	W
	16,						57.2	W
	28,						58.8	E
Mar.	1,						57.2	E

α *Aurigae.*

1887.							
Feb.	8,	5	8	21	+45	52	55.3	W
	9,						55.1	W
	15,						54.8	W
	16,						55.8	W
	28,						54.1	E
Mar.	1,						55.1	E

Gr. 966.

1887.							
Feb.	8,	5	24	37	+74	58	1.3 W
	9,						0.7 W
	15,						0.7 W
	16,						1.3 W
	28,						3.9 E
Mar.	1,						1.8 E
	10,						1.1 E

φ^1 *Orionis.*

1887.							
Feb.	8,	5	28	37	+ 9	24	42.7 W
	9,						42.6 W
	15,						43.0 W
	16,						42.9 W
	28,						41.9 E
Mar.	1,						42.1 E
	10,						41.8 E

α *Columbae.*

1887.							
Feb.	8,	5	35	31	−34	8	3.0 W
	9,						7.5 W
	15,						7.3 W
	16,						5.0 W
	28,						6.0 E
Mar.	1,						7.0 E
	10,						6.6 E

o *Aurigae.*

1887.							
Feb.	8,	5	37	9	+49	46	32.0 W
	9,						32.2 W
	15,						32.5 W
	16,						32.2 W
	28,						32.6 E
Mar.	1,						32.6 E
	10,						32.3 E

γ *Leporis.*

1887.							
Feb.	9,	5	39	45	−22	29	10.0 W
	16,						9.4 W
Mar.	1,						10.9 E
	10,						9.8 E

ν *Aurigae.*

1887.							
Feb.	8,	5	43	39	+39	6	51.5 W
	9,						50.5 W
	15,						51.6 W
	16,						51.2 W
	28,						50.1 E
Mar.	1,						51.5 E
	10,						50.6 E

α Orionis.

1887.							
Feb.	8,	5	49	3	+ 7	22	5.5 W
	9,						5.2 W
	15,						4.3 W
	16,						5.2 W
	28,						5.7 E
Mar.	1,						5.2 E
	10,						4.9 E

β Aurigae.

1887.							
Feb.	8,	5	51	14	+44	56	5.2 W
	9,						5.5 W
	15,						5.4 W
	16,						5.9 W
	28,						6.1 E
Mar.	1,						6.0 E
	10,						5.9 E

22 H. *Camelopardalis.*

1887.							
Feb.	8,	6	6	24	+69	21	28.0 W
	9,						28.6 W
	15,						28.9 W
	16,						29.0 W
	28,						29.8 E
Mar.	1,						30.0 E
	10,						28.8 E

η Geminorum.

1887.							
Feb.	8,	6	8	3	+22	32	20.4 W
	9,						18.3 W
	15,						17.9 W
	16,						18.0 W
	28,						18.2 E
Mar.	1,						18.0 E
	10,						17.0 E

ζ Canis Majoris.

1887.							
Feb.	8,	6	15	58	—30	0	49.8 W
	9,						51.2 W
	15,						49.3 W
	16,						50.1 W
	28,						50.9 E
Mar.	1,						52.4 E
	10,						49.9 E

8 *Monocerotis,*

1887.							
Feb.	8,	6	17	47	+ 4	38	57.2 W
	9,						57.6 W
	15,						57.6 W
	16,						58.0 W
	28,						56.5 E
Mar.	1,						56.0 E
	10,						56.4 E

23 H. *Camelopardalis.*

1887.							
Feb. 8,	6	26	56	+79	41	2.7	W
9,						2.3	W
15,						2.7	W
16,						1.8	W
28,						2.4	E
Mar. 1,						2.3	E
10,						2.3	E

γ Geminorum.

1887.							
Feb. 8,	6	31	11	+16	29	41.1	W
9,						39.2	W
15,						41.2	W
16,						40.2	W
28,						40.7	E
Mar. 1,						41.0	E
10,						41.0	E

S. *Monocerotis.*

1887.							
Feb. 8,	6	34	45	+ 9	59	57.4	W
9,						57.2	W
15,						58.0	W
16,						56.3	W
28,						56.7	E
Mar. 1,						56.3	E
10,						57.1	E

ψ^1 *Aurigae.*

1887.							
Feb. 8,	6	38	36	+43	41	19.5	W
9,						20.2	W
15,						19.6	W
16,						19.6	W
28,						19.1	E
Mar. 1,						19.3	E
10,						18.7	E

43 *Camelopardalis.*

1887.							
Feb. 9,	6	41	31	+69	1	4.4	W
15,						5.7	W
16,						4.5	W
28,						6.3	E
March 1,						6.1	E
10,						6.0	E

κ Canis Majoris.

1887.							
Feb. 9,	6	45	37	−32	22	45.0	W
15,						42.0	W
16,						42.4	W.
28,						44.1	E
Mar. 1,						43.0	E
10,						42.5	E

15 *Lyncis.*

1887.							
Feb. 9,	6	47	29	+58	34	10.8	W
15,						10.6	W
16,						10.6	W
28,						10.7	E
Mar. 1,						10.3	E
10,						11.0	E

ε Canis Majoris.

1887.							
Feb. 9,	6	54	11	−28	49	8.5	W
15,						6.1	W
16,						8.3	W
28,						10.7	E
Mar. 1,						8.5	E
10,						8.9	E

ζ Geminorum.

1887.							
Feb. 9,	6	57	24	+20	44	6.0	W
15,						5.9	W
16,						6.8	W
28,						5.4	E
Mar. 1,						6.1	E
10,						6.4	E

21 *Lyncis.*

1887.							
Feb. 15,	7	17	51	+49	26	4.8	W
16,						4.8	W
28,						4.7	E
Mar. 1,						5.6	E
10,						5.7	E

Gr. 1308.

1887.							
Feb. 16,	7	19	7	+68	41	40.6	W
Mar. 1,						42.1	E
10,						42.8	E

β Canis Minoris.

1887.							
Feb. 15,	7	21	1	+8	30	58.2	W
16,						56.2	W
28,						57.7	E
Mar. 1,						56.5	E
10,						57.0	E

α Geminorum.

1887.							
Feb. 15,	7	27	23	+32	8	6.9	W
16,						6.3	W
28,						6.4	E
Mar. 1,						6.5	E
10,						6.8	E

f *Puppis.*

1887.							
Feb.	16,	7	33	11	−34	42	51.2 W
	28,						49.7 E
Mar.	1,						52.3 E
	10,						48.6 E

h *Ursae Majoris*, S. P.

1886.							
Dec.	4,	9	22	32	+63	33	34.8 E
	7,						34.2 W

α *Ursae Majoris*, S. P.

1886.							
Dec.	3,	10	56	41	+62	21	57.7 E
	4,						57.7 E
	6,						57.4 E
	7,						56.6 W
	8,						56.3 W
	9,						56.4 W

Gr. 1771, S. P.

1886.							
Nov.	26,	11	16	4	+64	57	14.7 E
Dec.	3,						14.3 E
	4,						16.1 E
	6,						14.4 E
	7,						15.6 W
	8,						13.7 W
	9,						13.9 W

3 *Draconis*, S. P.

1886.							
Nov.	26,	11	36	7	+67	22	32.8 E
Dec.	3,						34.7 E
	4,						34.7 E
	6,						32.6 E
	7,						31.7 W
	8,						32.0 W
	9,						31.2 W

76 *Ursae Majoris*, S. P.

1886.							
Nov.	26,	12	36	35	+63	20	20.4 E
Dec.	3,						21.7 E
	4,						22.0 E
	6,						21.5 E
	8,						20.0 W
	9,						20.3 W
	20,						20.0 W

α *Draconis*, S. P.

1886.							
Dec.	21,	14	1	18	+64	55	14.9 W
	22,						14.2 W

Gr. 2164, S. P.

1886.							
Dec.	21,	14	48	33	+59	45	26.3 W
	22,						25.7 W

ι Draconis, S. P.

1886.							
Dec.	21,	15	22	24	+59	21	54.4 W
	22,						56.1 W

f Draconis, S. P.

1887.							
Feb.	8,	17	32	25	+68	12	26.8 W
	15,						25.4 W
	16,						24.0 W
	28,						25.0 E
Mar.	1,						24.6 E
	10,						25.7 E

δ Draconis, S. P.

1887.							
Feb.	16,	19	12	32	+67	27	45.5 W
	28,						46.1 E
Mar.	1,						46.0 E
	10,						46.0 E

ζ Capricorni.

1886.							
Dec.	4,	21	20	9	−22	54	18.6 E
	6,						17.0 E

g Cygni.

1886.							
Dec.	3,	21	25	15	+46	2	16.5 E
	4,						16.2 E
	6,						16.8 E
	7,						16.8 W
	8,						17.2 W

β Cephei.

1886.							
Dec.	4,	21	27	11	+70	3	38.4 E
	6,						37.4 E
	7,						36.8 W
	8,						36.8 W

74 Cygni.

1886.							
Dec.	3,	21	32	23	+39	54	5.7 E
	4,						5.0 E
	6,						5.2 E
	7,						5.6 W
	8,						5.4 W

ι Piscis Australis.

1886.							
Nov.	26,	21	38	8	−33	32	44.1 E
Dec.	3,						45.2 E
	4,						42 0 E
	6,						45.8 E
	7,						44.4 W

π^2 Cygni.

1886.							
Nov. 26,	21	42	35	+48	46	56.2	E
Dec. 3,						56.1	E
4,						56.0	E
6,						56.5	E
7,						56.6	W
8,						56.3	W

16 Pegasi.

1886.							
Nov. 26,	21	47	53	+25	25	20.1	E
Dec. 3,						19.5	E
4,						19.7	E
6,						19.6	E
7,						19.6	W
8,						20.1	W

η Piscis Australis.

1886.							
Nov. 26,	21	54	15	−29	0	1.7	E
Dec. 3,						1.2	E
4,						2.0	E
6,						1.4	E
7,						1.3	W
8,						1.3	W

ι Aquarii.

1886.							
Dec. 3,	22	0	17	−14	25	21.3	E
4,						20.1	E
6,						21.4	E
7,						21.1	W
8,						21.6	W

γ Aquarii.

1886.							
Nov. 26,	22	15	46	− 1	57	42.4	E
Dec. 3,						43.4	E
4,						41.8	E
6,						42.3	E
7,						42.0	W
8,						42.2	W
9,						43.0	W

3 Lacertae.

1886.							
Nov. 26,	22	19	5	+51	39	29.4	E
Dec. 3,						29.5	E
4,						30.0	E
6,						30.2	E
7,						29.1	W
8,						29.1	W
9,						28.5	W

7 Lacertae.

1886.								
Nov.	26,	22	26	36	+49	41	47.5	E
Dec.	3,						48.6	E
	4,						48.8	E
	6,						48.3	E
	7,						48.2	W
	8,						48.2	W
	9,						47.8	W

η Aquarii.

1886.								
Dec.	3,	22	29	30	−0	42	19.3	E
	4,						17.4	E
	6,						18.1	E
	7.						18.2	W
	8,						18.2	W
	9,						19.1	W

ε Piscis Australis.

1886.								
Dec.	3,	22	34	17	−27	38	17.3	E
	4,						16.3	E
	6,						17.2	E
	7,						16.7	W
	8,						16.3	W
	9,						17.5	W

η Pegasi.

1886.								
Dec.	3,	22	37	40	+29	37	30.2	E
	4,						29.4	E
	6,						30.0	E
	7,						29.9	W
	8,						29.9	W
	9,						28.2	W

13 *Lacertae.*

1886.								
Dec.	3,	22	39	0	+41	13	16.0	E
	4,						15.8	E
	6,						16.6	E
	7,						15.8	W
	8,						16.9	W
	9,						15.5	W

ι Cephei.

1886.								
Dec.	3,	22	45	37	+65	36	4.4	E
	4,						4.5	E
	6,						4.2	E
	7,						3.8	W
	8,						4.4	W
	9,						3.8	W

δ Aquarii.

1886.							
Dec.	3,	22	48	36	−16	25	37.5 E
	4,						37.2 E
	6,						36.7 E
	7,						36.8 W
	8,						36.9 W
	9,						37.7 W

α Piscis Australis.

1886.							
Dec.	3,	22	51	21	−30	13	33.8 E
	4.						34.7 E
	6,						36.2 E
	7,						34.8 W
	8,						34.4 W
	9,						34.9 W

α Pegasi.

1886.							
Dec.	3,	22	59	5	+14	25	31.2 E
	4,						30.7 E
	6,						31.1 E
	7,						30.6 W
	8,						30.3 W
	9,						29.9 W

c^2 *Aquarii.*

1886.							
Nov.	26,	23	3	22	−21	47	27.6 E
Dec.	3,						28.3 E
	4,						27.9 E
	6,						27.7 E
	7,						28.1 W
	8,						28.4 W
	9,						28.8 W

Br. 3077.

1886.							
Dec.	3,	23	7	48	+56	32	20.4 E
	4,						20.6 E
	6,						21.0 E
	7,						21.3 W
	8,						20.9 W
	9,						21.1 W

λ Andromedae.

1886.							
Dec.	3,	23	31	59	+45	50	26.3 E
	4,						26.5 E
	6,						26.8 E
	7,						26.3 W
	8,						26.7 W
	9,						26.2 W

LAC. *δ Sculptoris.*

1886.							
Nov.	26,	23	42	59	−28	45 40.0	E
Dec.	3,					38.9	E
	4,					38.8	E
	6,					39.7	E
	7,					39.7	W
	8,					39.7	W
	9,					40.1	W

φ Pegasi.

1886.							
Nov.	26,	23	46	41	+18	29 12.4	E
Dec.	3,					11.9	E
	4,					12.9	E
	6,					13.6	E
	7,					12.8	W
	8,					11.9	W
	9,					13.0	W

ρ Cassiopeiae.

1886.							
Nov.	26,	23	48	41	+56	51 54.6	E
Dec.	3,					54.3	E
	4,					54.2	E
	6,					55.0	E
	7,					55.6	W
	8,					55.4	W
	9,					55.4	W

ω Piscium.

1886.							
Nov.	26,	23	53	27	+6	13 54.6	E
Dec.	3,					56.3	E
	4,					54.5	E
	6,					55.1	E
	7,					54.0	W
	8,					55.4	W
	9,					54.6	W

VI. THE LARGE EQUATORIAL.

The 15½ inch equatorial was employed at intervals during the fall of 1886 in observing double stars, and during January, 1887, a series of observations of Sappho =(80) were made. It was also employed three nights in February in observing comet *b*, 1887. As has been customary heretofore this instrument has been devoted to the entertainment of visitors on the evenings of the first and third Wednesdays of every month.

The constants of the equatorial were investigated in 1886 with the following results:

1886.	η	ξ	e
Aug. 24,	.....	—62″.0	—8″.65
Aug. 26,	—2.90 s	.....	.....
Aug. 30,	.....	—61.4	—11.74
Sept. 4,	—2.26	.....	.....

Declination observations with this instrument are rendered difficult by the fact that the verniers of the finely divided circle in declination are so inconveniently contrived as to make it an extremely awkward and tedious affair to read them.

It was found necessary to adjust the indices of the coarse circles in Right Ascension and declination. The black line which constitutes the index of the declination circle was also made considerably narrower in order to facilitate pointing. It is now possible to point the telescope with considerable precision upon the object sought, using only the coarsely divided circles.

The driving clock was thoroughly overhauled in September, 1886, and since then has given very good satisfaction. The whole mounting of the telescope has been thoroughly cleaned and now works well, even at a temperature of —20° Farhenheit. There is a full description of the micrometer of this instrument in Vol. I, *Publications of the Washburn Observatory*. The micrometer has been taken apart and

cleaned and the movable and transverse wire which were broken have been replaced. The bright wire illumination has been invariably used in the observations, the illumination being effected by means of an oil lamp. A large counterpoise, which also served as a handle by which to move the telescope in either co-ordinate, but which interfered with the reversal of the micrometer, has been removed and a more convenient arrangement for counterpoising has been substituted.

OBSERVATIONS OF SAPPHO = (80).

These observations of Sappho, number (80) of the minor planets, were undertaken by Dr. DAVIES at the request of Mr. ROBERT BRYANT, of the Royal Astronomical Society, London. The path of the planet at opposition (1887) passed through the Milky Way, and the great number of small stars in the field of the telescope rendered the identification of the planet unusually difficult. The number of bright comparison-stars available was small. The difference of Right Ascension was observed on the chronograph, and the difference in declination was measured with the micrometer screw.

OBSERVATIONS OF SAPPHO = (80).

1887, Madison, M. T.	Star.	No. Comps.	(80) — Star		(80)'s Apparent		Log. P Δ		Observer.
			$\Delta\ \alpha$	$\Delta\ \delta$	α	δ	For α.	For δ.	
h. m. s.			m. s.	′ ″	h. m. s.	° ′ ″			
Jan. 14, 12 14 21	1	10	+1 4.21	−7 6.30	6 58 7.75	+9 4 6.5	9.0000	0.6920	M. U.
Jan. 14, 12 58 51	1	6	+1 2.17	−7 0.67	6 58 5.71	+9 4 12.1	9.2648	0.6972	J. E. D.
Jan. 17, 12 38 31	1	20	−1 58.79	−0 23.70	6 55 4.76	+9 10 48.8	9.2304	0.6955	M. U.
Jan. 20, 10 55 3	2	6	−4 51.23	+0 17.67	6 52 17.03	+9 18 12.0	7.7782	0.6866	M. U.
Jan. 20, 11 52 36	2	5	−4 53.47	+0 24.23	6 52 14.79	+9 18 18.5	9.0531	0.6893	J. E. D.
Jan. 25, 10 28 3	3	9	+2 33.02	−1 17.97	6 47 57.64	+9 32 53.4	7.3000	0.6848	M. U.
Jan. 26, 10 6 28	3	1	+1 46.30	+1 50.87	6 47 10.92	+9 36 2.2	8.5051n	0.6848	M. U.
Jan. 28, 9 42 3	3	10	+0 16.54	+8 18.60	6 45 41.14	+9 42 29.9	7.7559n	0.6839	A. M. L.
Jan. 28, 10 10 51	3	15	+0 15.54	+8 24.15	6 45 40.14	+9 43 35.4	7.6990n	0.6830	M. U.

ADOPTED MEAN PLACES FOR 1887.0 OF COMPARISON—STARS.

Date 1887.	Star.	α	Red. to App. Place.	δ	Red. to App. Place.	Authorities.
		h. m. s.	s.	° ′ ″	″	
January 14	1	6 57 2.60	+0.94	+9 11 23.1	−10.4	½ (Lalande+2d. Radcliffe Cat.+Glasgow Cat.)
January 17.....	1	6 57 2.60	+0.95	+9 11 23.1	−10.6	½ (Lalande+2d. Radcliffe Cat.+Glasgow Cat.)
January 20.....	2	6 57 7.29	+0.97	+9 18 5.2	−10.9	½ (Gr. VII+2d. Radcliffe Cat.+Glasgow Cat.)
January 25.....	3	6 45 23.66	+0.96	+9 34 22.4	−11.1	½ (Weisse's Bessel+Glasgow Cat.)
January 26.....	3	6 45 23.66	+0.96	+9 34 22.4	−11.1	½ (Weisse's Bessel+Glasgow Cat.)
January 28.....	3	6 45 23.66	+0.94	+9 34 22.4	−11.2	½ (Weisse's Bessel+Glasgow Cat.)

OBSERVATIONS OF COMET *b* 1887 (BROOKS).

Comet *b* 1887 was observed on three nights in February when the temperature was too low for meridian circle work. The comet had a marked central condensation and was easily observed with accuracy.

OBSERVER, M. U.

1887; Madison, Mean Time.		Star.	No. comp's.	Comet minus Star		Comet's Apparent		Log. P Δ	
				$\Delta\alpha$	$\Delta\delta$	α	δ	For α	For δ
	h m s			m s	′ ″	h m s	° ′ ″		
February 11.....	8 55 44	1	9	−0 47.54	−9 33.8	1 11 57.88	+75 57 44.4	0.2493	9.0578
February 13..... ...	9 19 24	2	6	+7 41.47	−6 8.1	1 41 54.40	+73 56 5.6	0.1875	9.5834
February 27....	10 1 7	3	8	+1 48.31	+5 6.2	3 19 45.79	+57 57 38.0	9.8985	0.3117

ADOPTED MEAN PLACES OF COMPARISON STARS FOR 1887.0.

Star.	α	Red to App. place.	δ	Red to App. Place.	Authorities.
	h m s	s	° ′ ″	″	
1	1 12 46.57	−1.15	+76 7 7.1	+11.1	½ [Fedorenko+Argelander].
2	1 34 13.78	−0.85	+74 2 3.1	+10·6	½ [2 (Radcliffe I)+Fedorenko+Argelander.]
3	3 17 57.64	−0.16	+57 52 25.1	+ 6.7	Argelander.

DOUBLE STAR OBSERVATIONS.

The observations of double stars follow. There are two series of these observations. The first series was selected from STRUVE'S catalogue, and consist for the most part of comparatively bright pairs. The second series embraces a few of the list of 88 double stars, discovered and measured at this observatory in 1881 by Mr. S. W. BURNHAM.

The programme for observing double stars was as follows:

The zero of the position circle was always determined at the beginning of each night's work, and occasionally also at the close, but, as the zero remained practically constant for a long time, one determination generally sufficed.

The micrometer zero was only determined in a few instances, when it was needed for the reduction, as, except in the case of very wide doubles, the method of observing by double distances was employed.

After pointing the telescope on a star six measures of position angle were taken, three in each position of the micrometer. The fixed wires parallel to the movable wire were used in these measures, as the transverse wire could not be seen without excessive illumination.

There are two verniers, A and B, by means of which the position circle is read to five minutes of arc. Vernier A alone was read in these observations.

Before taking the measures in distance, the micrometer was clamped at 90° from the mean of the position readings.

Ten measures of distance were usually made, five with the fixed wire on the brighter star, and the movable wire on the fainter star, and five with the fixed wire on the fainter and the movable wire on the brighter star.

The value employed for one revolution of the micrometer screw was that given on page 285, of Volume II, *Publications of the Washburn Observatory.*

No estimates of magnitude are printed. The magnitudes given in the first series are from Volume IX, of the *Pulkowa Observations,* and those in the second series are from Volume I, of the *Publications of the Washburn Observatory.*

The four eypieces used are designated as I power 195, II power 260, III power 430 and IV power 750.

The observers are given in the last column. D = DR. DAVIES, L=MISS LAMB, and U = MR. UPDEGRAFF.

SERIES 1.

Σ. 2312.

R. A. 18h 16.8m
Decl. +28° 17′ 8.5—9.5

1886.720	337.5	1.43	III	U
.727	339.4	1.40	III	U
.771	340.9	1.48	III	U
1886.739	339.3	1.44		

Σ. 2360.

R. A. 18h 34.5m
Decl. +20° 49.5′ 7.5—8.7 7.7—8.8 Eng.

	°	″		
1836.700	5.7	2.46	II	U
.727	0.6	2.44	III	U
.727	1.5	2.52	III	D
.741	1.8	2.61	III	U
.741	3.3	2.62	III	L
1886.727	2.6	2.53		

Σ. 2369

R. A. 18h 38.2m
Decl. +2° 31′ 7.5—8.0 Σ 7.8—8.9 O.Σ

	°	″		
1886.719	96.0	1.40	III	U
.723	91.8	1.47	III	L
.723	99.3	1.39	III	U
.755	98.5	1.26	III	U
.756	99.0	1.37	III	L
1886.735	96.9	1.38		

Σ. 2437.

R. A. h. 18 m. 56.9
Decl. +19° 0′ 7.8—8.0

	°	″		
1886.771	61.6	1.05	III	L
.782	61.2	1.39	III	L
.801	59.7	1.30	III	L
.807	61.7	1.13	III	L
1886.790	61.0	1.22		

Σ. 2454.

R. A. h. 19 m. 1.7
Decl. +30° 16′ 8.0—9.2

	°	″		
1886.771	234.4	0.80	IV	U
.782	239.2	0.90	III	U
.826	238.9	0.82	III	U
1886.793	237.5	0.84		

See remarks by O.Σ.

Σ. 2484.

R. A. h. 19 m. 9.3
Decl. +18° 53′ 7.4—8.9

	°	″		
1886.722	223.7	2.80	III	L
.744	224.6	2.82	III	L
.744	226.5	2.58	III	U
.755	226.9	2.70	III	U
1886.741	225.4	2.72		

Σ. 2541.

R. A. h. 19 m. 30.6
Decl. −10° 41′ 8.2–9.8

	°	″		
1886.744	332.4	4.17	III	L
.755	330.7	4.09	III	L
.760	334.5	4.25	III	L
.763	333.5	3.82	III	L
1886.756	332.8	4.08		

Σ. 2556.

		h.	m.		
	R. A.	19	34.6		
	Decl.	+22°	0′		7.3–7.8
	°	′			
1886.760	162.6	0.67		IV	U
.763	158.7	0.57		IV	U
.768	159.8	0.59		IV	U
1886.764	160.4	0.61			

Σ. 2573.

		h.	m.		
	R. A.	19	34.6		
	Decl.	+22°	0′		7.8–7.8
	°	″			
1886.719	120.6	2.98		III	U
.744	121.3	3.12		III	U
.744	121.3	3.21		IV	L
.760	121.8	2.83		IV	U
1886.742	121.2	3.04			

Σ. 2583.

		h.	m.		
	R. A.	19	43.3		
	Decl.	+11°	32′		6.0–6.8
	°	″			
1886.755	120.7	1.45		III	U
.760	117.9	1.36		IV	U
.763	117 2	1.32		IV	U
.771	119.7	1.26		III	U
1886.762	118.9	1.35			

Σ. 2585.

		h.	m.		
	R. A.	19	44		
	Decl.	+18	51′		5.7–8.8
	°	′	″		
1886.705	312.3	8.78		III	U
.727	311.7	8.76		III	U
.727	—-	8.89		III	D
.755	312.2	8.76		III	U
.823	312.0	8.62		III	U
1886.747	312.0	8.76			

Σ. 2587.

R. A. 19h 45.8m
Decl. +3° 48′
6.5—9.2

1886.760	99.8	4.17	III	U
.763	100.9	4.24	IV	U
.768	100.8	4.24	IV	U
.807	98.7	4.14	III	U
1886.774	100.0	4.20		

Σ. 2606.

R. A. 19h 54.
Decl. +32° 58′.
7.5—8.2

1886.744	138.4	1.27	III	U
.755	139.4	1.15	III	U
.751	142.1	1.30	III	U
.801	141.8	....	III	U
1886.784	140.4	1.24		

Σ. 2616.

R. A. 19h 57.5m
Decl. +14° 16′.
6.8—9.7

1886.763	266.9	3.43	IV	L
.768	264.3	3.44	IV	L
.771	264.8	3.67	III	L
.782	267.5	3.57	III	L
1886.771	265.9	3.53		

Σ. 2695.

R. A. 20h 27.1m
Decl. +25° 25′.
6.2—8.0

1886.763	76.5	1.05	IV	U
.782	76.0	1.26	III	U
.826	78.8	1.14	III	U
1886.790	77.1	1.15		

Σ. 2711.

R. A. 20h 34.9m
Decl. +30° 7′.

8.0—9.0

	°	″		
1886.763	228.9	2.60	III	L
.771	228.4	2.28	III	L
.782	228.9	2.65	III	L
.826	228.5	2.62	III	L
1886.786	228.4	2.54		

Σ. 2725.

R. A. 20h 40.9m
Decl. +15° 30′.

7.8—8.0

	°	′		
1886.705	1.9	5.88	III	U
.705	5.3	5.16	III	L
.771	1.9	5.40	III	L
.771	1.7	5.20	III	U
.782	1.1	5.22	III	L
.782	2.4	5.16	III	U
1886.753	2.4	5.25		

Σ. 2735.

R. A. 20h 49.9m
Decl. +4° 6′

6.2—7.7

	°	″		
1886.823	286.6	2.10	III	U
.829	286.5	1.91	III	U
1886.826	286.6	2.00		

Σ. 2742.

R. A. 20h 56.6m
Decl. +6° 43′

7.1—7.1

	°	″		
1886.823	223.3	2.75	III	U
.829	223.4	2.91	III	U
1886.826	222.8	2.83		

Σ. 2744.

		h. m.		
	R. A.	20 57.3		
	Decl.	+1° 5′		6.3–7.0
1886.760	172.7	1.68	III	L
.768	169.7	1.40	III	U
.871	171.3	1.54	III	L
.771	169.3	1.57	III	U
.782	170.6	1.78	III	L
.782	166.5	1.49	III	U
1886.772	170.0	1.58		

Σ. 2745.

		h. m.		
	R. A.	20 57.9		
	Decl.	−6° 16′		5.6–7.7
1886.780	191.7	2.81	III	U
.763	189.0	2.98	III	U
.782	192.2	2.82	III	U
.823	191.2	2.81	III	U
1886.787	191.0	2.86		

Σ. 2760.

		h. m.		
	R. A.	21 2.1		
	Decl.	+33° 41′		7.3–8.1
1886.760	225.8	8.12	III	U
.782	224.9	7.86	III	U
.826	225.4	8.05	III	U
1886.789	225.4	8.01		

Σ. 2791.

		h m		
	R. A.	21 18.0		
	Decl.	+8° 53′		8.5–9.0
1886.823	104.9	2.47	III	L
.829	104.7	2.54	III	L
1886.826	104.8	2.50		

Σ. 2799.

R. A. 21h 23.3m
Decl. +10° 36′ 6.6—6.6

	°	″		
1886.719	305.8	1.51	III	U
.760	307.2	1.34	III	U
.826	306.9	1.38	III	U
1886.768	306.6	1.41		

Σ. 2322.

R. A. 21h 38.9m
Decl. +28° 14′ 4.0—5.0

	°	″		
1886.700	118.3	3.79	II	U
.744	119.8	3.44	III	U
.826	121.0	3.21	III	U
1886.757	119.7	3.48		

Σ. 2325.

R. A. 21h 38.9m
Decl. +28° 14′ 4.0—5.0

	°	″		
1886.719	114.3	——	II	U
.763	111.1	1.01	III	L
.768	115.4	1.25	III	L
.823	116.4	1.48	III	L
.826	114.1	1.26	III	L
1886.780	114.3	1.25		

Σ. 2847.

R. A. 21h 52.1m
Decl. −4° 2′ 7.6—8.0

	°	″		
1886.763	307.9	1.15	III	U
.768	303.0	1.10	III	U
.826	304.1	1.09	III	U
1886.786	305.0	1.11		

Σ. 2862.

	h	m		
R. A.	22	1.2		
Decl.	+0°	1′		7.6—8.0

	°	″		
1886.823	181.3	2.90	III	L

Σ. 2901.

	h.	m.		
R. A.	22	18.7		
Decl.	+3°	14′		8.5—9.1

	°	″		
1886.823	150.1	2.98	III	L

Σ. 2929.

	h.	m.		
R. A.	22	33.5		
Decl.	+9°	54′		9.0—9.5

	°	″		
1886.823	356.3	2.01	III	L

Σ. 2957.

	h.	m.		
R. A.	22	50.4		
Decl.	+16°	52′		8.6—10.4

	°	″		
1886.823	225.1	4.78	III	L

Σ. 2995.

	h.	m.		
R. A.	23	10.4		
Decl.	−2°	14′		7.7—8.0

	°	″		
1886.823	29.1	4.55	III	L

Σ. 3000.

	h.	m.		
R. A.	23	13.1		
Decl.	+24°	34′		8.7—8.8

	°	″		
1886.823	50.7	3.65	III	U

Σ. 3023.

		h.	m.		
	R. A.	23	26.6		
	Decl.	+16°	47′		7.0—9.7
	°		″		
1886.763	286.7		1.88	III	U

Σ. 3045.

		h.	m.		
	R. A.	23	48.6		
	Decl.	+1°	49′		7.8—9.8
	°		″		
1886.763	265.2		1.72	III	L

SERIES 2.

β. 777. D. M. (—1°) 32.

		h.	m.	s.		
	R. A.	0	14	57.		
	Decl.	0°	55′.			8.5 and 9.5
	°		″			
1886.850	165.0		3.86		II	L
.870	168.2		3.96		II	L
1886.860	166.6		3.91			

β. 780. D. M. (36°) 79.

		h.	m.	s.		
	R. A.	0	26	0.		
	Decl.	+37°	5′.			8.5, 9.8
	°		″			
1886.867	144.1		2.37		II	U

β. 781. Ll. 1337.

		h.	m.	s.		
	R. A.	0	44	0.		
	Decl.	+68°	20′			81, 8.6
	°		″			
1886.856	29.0		1.05		III	U
.870	27.4		1.30		III	L
1886.863	28.2		1.18			

β. 782. Ll. 2357.

	R. A.	h. m. s. 1 13 18.		
	Decl.	+55° 35′		8.0, 9.6
1886.856	76.1	2.95	III	L
.870	76.3	2.68	III	L
1886.863	76.2	2.82		

β. 786. D. M. (55°) 563.

	R. A.	h. m. s. 2 9 18		
	Decl.	+55° 12′		8.5, 9.9
1886.856	350.2	5.24	III	U
.870	351.0	4.90	III	U
1886.863	350.6	5.07		

β. 830. Ll. 37916.

	R. A.	h. m. s. 19 49 2		
	Decl.	1° 9′		8.0, 11.2
1886.867	107.2	3.12	III	L
.875	104.1	2.69	II	L
1886.871	105.6	2.90		

β. 832. Lamont 3095.

	R. A.	h. m. s. 20 0 5.		
	Decl.	−10° 59′		8.6, 8.9
1886.864	104.0	1.35	III	U
.667	103.9	1.36	III	U
1886.866	104.0	1.36		

β.833. Ll. 38625.

h. m. s.
R. A. 20 5 11.
Decl. −3° 30′. 8.4, 8.8, 11.7.

A and B.

	°	″		
1886.856	63.0	120.13	II	L
.864	63.0	119.57	III	L
.867	63.1	119.26	II	L
1886.862	63.0	119.65		

B and C.

	°	″		
1886.867	76.0	2.53	II	L

β.834. D. M. (60°) 4638.

h. m. s.
R. A. 20 39 47.
Decl. +6° 43′. 8.5. 11.0.

	°	″		
1886.853	131.7	2.02	II	U
.856	130.3	1.84	II	U
.864	132.2	2.13	III	U
.867	132.5	1.66	II	U
1886.860	131.7	1.91		

.837. D. M. (−1°) 4170.

h. m. s.
R. A. 21 2 43.
Decl. −0° 16′. 8.4, 10.1.

	°	″		
1886.828	186.2	3.32	III	L
.831	186.7	3.21	III	L
.850	185.9	3.50	I	L
.864	185.6	3.29	III	L
1886.843	186.1	3.33		

β.838. Ll. 41452.

h. m. s.
R. A. 21 14 51.
Decl. +2° 37′. 7.6, 9.5.

	°	″		
1886.829	92.5	1.71	III	L
.831	94.6	1.75	I	L
.864	94.5	1.60	III	L
1886.841	93.9	1.69		

β.840. Lamont 8586.

	R. A. 21 46 10.			
	Decl. —2° 17′		8.7, 10.0:.	
	°	″		
1886.829	38.5	2.89	III	U
.831	38.4	2.72	III	U
.853	40.4	3.14	III	U
1886.838	39.1	2.92		

β. 842. D. M. (4°) 4811.

	R. A. 22 3 30.			
	Decl. +5° 6′.		8.8, 9.1.	
	°	″		
1886.829	120.4	1.25	III	U
.831	120.4	1.28	III	U
.864	115.4	1.30	III	U
1886.841	118.7	1.28		

β. 843. D. M. (+ 1°) 4606.

	R. A. 22 18 43.			
	Decl. +2° 3′.		8.4, 12.5.	
	°	″		
1886.829	229.9	3.13	III	L
.831	229.1	3.33	III	L
1886.830	229.5	3.23		

β. 844. LL. 43912.

	R. A. 22 23 32.			
	Decl. +5° 2′.		8.1, 9.3, 10.9.	
	A and B.			
	°	″		
1886.829	34.1	98.85	III	U
.831	34.4	99.08	III	U
.850	33.9	98.46	I	U
.867	34.2	98.85	II	U
1886.844	34.2	98.81		

B and C.

	°	″		
1886.829	317.2	3.50	III	U
.831	317.6	3.36	III	U
.653	319.0	3.08	III	U
.867	317.1	3 05	II	U
1886.845	317.7	3.25		

β. 846. LL. 44688.

R. A. 22 h. 44 m. 33 s.
Decl. +23° 54′. 8.6, 12.2.

	°	″		
1886.826	96.3	2.40	III	L
.829	94.9	1.95	III	L
.867	93.1	1.99	II	L
1886.841	94.8	2.11		

β. 847. W. XXII, 1103.

R. A. 22 h. 48 m. 45 s.
Decl. +19° 42′. 8.5, 9.2.

	°	″		
1886.829	35.9	6.44	III	U
.850	37.4	6.79	I	U
.853	35.8	6.85	III	U
.875	36.4	6.69	III	U
1886.852	36.4	6.69		

β. 850. Ll. 44985.

R. A. 22 h. 54 m. 21 s.
Decl. +13° 13′. 8.1, 10.6.

	°	″		
1886.826	118.9	3.15	III	U
.850	118.1	3.02	II	U
.853	117.4	3.08	III	U
1886.843	118.1	3.08		

β. 852. Pegasi 306.

R. A. 23 h. 4 m. 50 s.
Decl. +25° 52′. 7.0, 10.8, 11.3.

A and B.

	°	″		
1886.864	283.0	58.33	II	U

B and C.

	°	″		
1886.864	10.6	1.24	III	U

β. 854. D. M (5°) 5164,

	R. A.	h. 23	m. 18	s. 13.		
	Decl.	+5°	23.′			8.7, 8.7.
	°		″			
1886.826	89.8		2.49		III	L
.850	89.8		2.48		II	L
.864	88.1		2.75		II	L
.867	92.2		2.45		II	L
.875	88 5		2.01		III	U
1886.856	89.7		2.44			

VII. AN INDEX TO CERTAIN CLASSES OF STARS CONTAINED IN THE GREENWICH CATALOGUES, REDUCED TO 1875.0.

By Miss ALICE M. LAMB.

In the *Vierteljahrsschrift* for 1871 there is article by ARGELANDER on the Greenwich New Seven-Year Catalogue. At the close of this article he expresses a wish for an index to the Greenwich Catalogues that should include those stars that are not found in FLAMSTEED'S catalogue. The object of such an index would be, he says, to save the computer the labor of looking through all the catalogues when searching for a star which is tolerably sure to be in one of them. As these catalogues are reduced to six different epochs the labor of looking up a star in them is considerable. In the case of FLAMSTEED'S stars this labor is so seldom required that it seems unnecessary to include them in this index.

The Index has been prepared according to the general plan suggested by ARGELANDER, the plan being somewhat modified at the advice of Professor HOLDEN and Dr. KRUEGER.

The Index includes all those stars in the six Greenwich Catalogues which are not there designated by their constellation name with number or letter or both. It also includes those variables that are designated as R, V, etc., with constellation name, and also all double or multiple stars given by their constellation name which have places given for two or more components. The places are all reduced to 1875.0. In cases where different magnitudes are assigned to the same star in the different catalogues the magnitude in the Index is taken from the latest catalogue in which the star occurs.

The reductions to 1875.0 have been checked by comparing the star places in the Index with the corresponding places in ARGELANDER'S and SCHOENFELD'S Durchmusterung for 1855.0, and in cases of stars having a greater N. P. D. than 113° with STONE'S Cape Catalogue for 1880.0. Every star in

the Index was identified in one of these two catalogues with the following exceptions:

P. II^h, 60, a sixth magnitude star, which is not in the Durchmusterung. Its place in CARRINGTON agrees with its Greenwich place.

W. B. III, 758, a star with a magnitude 8.9. It is not in the D. M. Its Greenwich place agrees with W. B.

VII, 1132, mag. 5.6. It is not to be found in the D. M., W. B. or Ll. and is not on the Akedemische Sternkarten.

Such of the stars lying south of N. P. D. 113° as are too faint to be included in STONE.

A few other stars having no magnitude given and probably fainter than the limit of magnitude of the Durchmusterung or of STONE.

In case of close doubles the D. M. usually gives but one place for both.

The first column contains the star's name as given in the Greenwich Catalogues; the star's number in that Greenwich Catalogue in which it first occurs is taken as its name in case no other name is given it in the Catalogues.

The second column contains the star's magnitude.

The third columns contains to the nearest second the star's R. A. for 1875.0.

The fourth columns contains the star's approximate annual variation in R. A. for the epoch 1875.0.

The fifth column contains the star's N. P. D. for 1875.0, given to the nearest tenth of a minute.

The sixth colnmn contains the star's approximate annual variation in N. P. D. for the epoch 1875.0.

The seventh column contains the list of the Greenwich Catalogues in which the star is found. These catalogues are designated as follows:

The first catalogue for the epoch 1840.0=A.

The Twelve Year Catalogue, which includes those stars found in A for 1840.0 and most of these and others for 1845.0=XII.

The Six Year Catalogue for 1850.0=VI.

The Seven Year Catalogue for 1860.0=VII.

The New Seven Year Catalogue for 1864.0=(VII).

The Nine Year Catalogue for 1872.0=IX.

NAME.	Mag.	R. A. 1875.0.			Annual variation in R. A.	N P. D. 1875.0.		Annual variation in N. P. D.	Greenwich Catalogues.
		h.	m.	s.	s.	°	′	′	
BR. 3212.....	6.7	0	0	8	+3.11	61	40.1	—0.33	XII, VI, VII (VII), IX.
VI, 1574.....	....	0	0	56	3.07	89	2.0	0.33	VI.
W.B. XXIII, 1227	9	0	1	0	3.07	101	43.9	0.33	VI.
W.B. XXIII, 1232	9	0	1	8	3.07	101	24.1	0.33	VI.
W.B. XXIII, 1242	9	0	1	25	3.07	101	49.5	0.33	VI, VII.
P. XXIII, 279..	6	0	1	42	3.07	124	13.7	0.33	XII, VI.
W.B. XXIII, 1249	6	0	1	54	3.07	99	31.1	0.33	VI, VII.
P. XXIII, 282..	6.5	0	2	19	3.08	92	55.1	0.33	IX.
BR. 3217.....	7.8	0	2	28	3.19	10	58.8	0.33	IX.
GR. 4242.....	8	0	2	31	3.08	40	50.3	0.33	VII.
A, 3.....	....	0	2	42	3.09	39	53.4	0.33	A, XII.
A, 4	....	0	2	50±	3.09	39	52.1	0.33	A, XII.
P. XXIII, 285..	6	0	2	59	3.08	118	41.1	0.33	XII. VI.
P. XXIII, 286..	7	0	3	31	3.06	93	15.5	0.33	(VII.)
P. 0, 1.....	6	0	3	55	3.08	95	58.6	0.33	IX.
BR. 3221.....	7	0	4	1	3.11	31	1.3	0.33	IX.
W. B. 0, 60.....	9	0	4	54	3.08	77	38.5	0.33	VI.
P. 0, 6	5	0	5	14	3.06	118	29.8	0.33	XII, VI.
W. B. 0, 80.....	8	0	6	14	3.06	104	18.5	0.33	VI.
GR. 18.	8	0	6	29	3.11	40	46.2	0.33	VII.
GR. 19.....	8	0	6	47	3.11	40	58.3	0.33	VII.
VI, 11.....	...	0	7	4	3.07	95	20.7	0.33	VI.
W. B. 0, 97.....	9	0	7	19	3.08	83	45.5	0.33	VI.
W. B. 0, 102....	9	0	7	38	3.06	103	0.0	0.33	VI, VII.
35 Pisc. (1st star)	6	0	8	32	3.08	81	52.5	0.33	A, XII, VII.
35 Pisc. (2d star)	7.8	0	8	33	3.08	81	52.7	0.33	A, XII, VII.
W. B. 0, 126 ...	9	0	8	59	3.08	80	56.7	0.33	VI.
W. B. 0, 128....	8	0	9	6	+3.08	77	16.7	—0.33	VI.

NAME.	Mag.	R. A. 1875.0.			Annual variation in R. A.	N. P. D. 1875.		Annual variation in N. P. D.	Greenwich Catalogues.
		h.	m.	s.	s.	°	′	′	
BR. 6	5.6	0	9	10	+3.29	13	44.6	—0.33	VII, (VII), IX.
VI, 16	10	0	9	18	3.06	101	43.8	0.33	VI, VII.
P. 0, 25	6	0	10	16	3.20	29	9.7	0.33	XII, IX.
38 Piscium (1st star)	7.8	0	10	58	3.09	81	49.3	0.34	(VII.)
38 Piscium (2d star).		0	10	58	3.09	81	49.3	0.34	(VII.)
GR. 35	6	0	11	6	3.15	39	15.8	0.33	A, XII.
P. 0, 33	6.7	0	11	23	3.07	89	0.4	0.33	(VII), IX.
W. B. 0, 189	8.9	0	12	26	3.06	101	38.7	0.33	VI.
LL. 316	8.9	0	12	53	3.07	90	9.5	0.33	(VII.)
RADCLIFFE 56	8	0	13	6	6.57	1	14.8	0.33	VI, VII, (VII), IX.
GR. 48	6	0	13	56	3.22	28	48.9	0.33	IX.
LL. 390	7	0	14	40	3.07	93	36.4	0.33	VI.
BR. 18	7	0	14	47	3.27	22	52.2	0.33	IX.
GR. 57	5.5	0	17	27	3.19	46	25.8	0.33	A, XII.
GR. 58	5.6	0	17	32	3.20	38	40.4	0.33	(VII).
BR. 24	6	0	19	10	3.67	10	38.4	0.33	A, XII, VII (VII), IX.
W. 0, 307	9	0	19	30±	3.07	88	44.6	0.33	XII.
BR. 27	7	0	19	34	3.11	70	32.8	0.33	(VII).
BR. 28	6.7	0	19	50	3.24	34	3.1	0.33	A, XII, IX.
GR. 64	7	0	20	28	3.22	40	42.4	0.33	VII.
VII, 27	....	0	20	49	3.07	90	43.0	0.33	VII.
P. 0, 73	7.8	0	20	55	3.06	87	52.8	0.33	(VII).
BR. 30	7	0	21	1	3.12	74	40.1	0.33	(VII).
P. 0, 79	5	0	21	44	2.99	123	41.8	0.33	VII.
P. 0, 98	7	0	23	43	3.08	85	50.0	0.33	(VII).
BR. 34	6.7	0	22	56	3.62	13	40.2	0.33	A, XII, IX.
W. B. 0, 361	8	0	22	56	3.04	104	15.2	0.33	VI.
W. B. 0, 366	8	0	23	15	+3.06	93	31.9	—0.33	VII, (VII).

NAME.	Mag.	R. A. 1875.0.	Annual variation in R. A.	N. P. D. 1875.0.	Annual variation in N. P. D.	Greenwich Catalogues.
		h. m. s.	s.	° ′	′	
P. 0, 93.....	7.8	0 24 30	+3.21	46 44.7	−0.33	A, XII.
W. B. 0, 387....	8	0 24 40	3.04	100 46.6	0.33	VI.
W. B. 0, 389....	9	0 24 45	3.04	100 46.5	0.33	VI.
B. F. 34.....	6	0 24 47	3.16	57 6.6	0.33	(VII.)
W. B. 0, 391 ..	9	0 24 52	3.06	93 35.1	0.33	VII, (VII).
W. B. 0, 393....	9	0 25 4	3.08	88 33.3	0.33	(VII.)
BR. 41	7	0 25 6	3.12	74 40.2	0.33	(VII.)
GR. 80	7½	0 25 20	3.28	36 52.5	0.33	A, XII.
(VII), 50.....	9	0 25 23	3.08	88 33.0	0.33	(VII.)
(VII), 51.....	Var	0 25 32	3.11	76 5.4	0.33	(VII.)
GR. 86.....	7.8	0 25 53	3.27	36 34.1	0.33	VI.
BR. 42.....	7	0 25 53	3.49	19 42.5	0.33	IX.
P. 0, 103	6.7	0 26 14	3.15	62 24.6	0.33	IX.
W. B. 0, 420....	9	0 26 17	3.08	88 31.9	0.33	(VII.)
VI, 30..	...	0 26 23	3.08	88 25.2	0.33	VI.
BR. 47	8	0 27 7	3.13	70 15.4	0.33	IX.
P. 0, 110	7	0 27 42	3.11	80 23.1	0.33	VII.
P. 0, 114	7.8	0 28 32	3.29	36 29.1	0.33	VI, VII.
W. B. 0, 467....	9	0 28 32	3.07	91 59.9	0.33	VII.
BR. 49.....	5.6	0 29 12	3.30	36 31.2	0.33	XII, VI, VII.
B. F. 40.... ...	6	0 29 26	3.11	77 28.6	0.33	VII, (VII).
VI, 34..... ...	....	0 29 27	3.05	98 35.5	0.33	VI.
P. 0, 124.....	5.6	0 29 59	3.23	46 12.0	0.33	VII.
BR. 48.....	6	0 30 25	4.25	8 11.8	0.33	(VII), IX.
OE. A. 547. ...	7	0 30 32	3.32	35 27.8	0.33	VI.
P. 0, 128.... ...	6	0 30 40	3.20	55 17.4	0.33	(VII.)
P. 0, 130.....	6	0 30 55	+3.09	115 27.3	−0.33	A, XII.

Name.	Mag.	R. A. 1875.0.			Annual variation in R. A.	N. P. D. 1875.0		Annual variation in N. P. D.	Greenwich Catalogues.
		h.	m.	s.	s.	°	′	′	
P. 0, 131.....	7	0	31	4	+3.09	87	33.1	—0.33	(VII).
(VII), 62.....	....	0	31	22	3.08	88	32.0	0.33	(VII).
Gr. 113.....	6	0	32	16	3.28	41	19.9	0.33	(VII), IX.
Gr. 115.....	8	0	32	40	3.28	41	6.8	0.33	VII.
Oe. A. 599	9	0	33	18	3.35	34	8.8	0.33	VI, VII, (VII).
Ll. 1022	8.9	0	33	21	3.22	51	14.8	0.33	(VII).
W. B. 0, 551...	9	0	33	40	3.04	98	33.6	0.33	VI.
W. B. (2) 0, 858	8	0	33	54	3.16	66	5.0	0.33	IX.
Gr. 120.....	6	0	34	38	3.51	24	32.3	0.33	VII, (VII), IX.
P. 0, 148	6.7	0	34	58	3.20	66	3.4	0.33	(VII), IX.
Ll. 1097.....	8.9	0	35	10	3.08	88	56.3	0.33	(VII).
Br. 64.....	7.8	0	35	14	3.24	49	59.8	0.33	(VII).
Br. 63.....	6.7	0	35	21	3.40	31	55.9	0.33	IX.
(VII), 77	....	0	35	29	3.08	88	53.3	0.33	(VII).
W. 0, 596.....	8.9	0	35	39	3.11	78	44.4	0.33	XII.
Ll. 1123.....	9	0	36	16	3.08	88	59.4	0.33	(VII).
W. B. 0, 608...	8.9	0	36	18	3.08	86	53.6	0.33	VII.
Arg. Zone +40°, No. 149	9	0	36	25	3.25	49	40.6	0.33	IX.
Ll. 1139.....	9½	0	36	46	3.11	78	58±	0.33	XII.
Br. 68	6.7	0	37	30	3.30	42	49.3	0.33	(VII).
VI, 43.....	....	0	38	12	3.04	97	11.6	0.33	VI.
W. B. 0, 649 ..	8	0	38	41	3.08	88	52.8	0.33	(VII).
P. 0, 171.....	6	0	39	3	3.06	95	18.9	0.33	VI.
W. B. 0, 658...	9	0	39	12	3.08	88	58.7	0.33	(VII).
24 η^1 Cassiopeiæ	4.3	0	41	33	3.57	32	50.9	0.32	VII.
24 η^2 Cassiopeiæ	....	0	41	34	+3.57	32	50.9	— 0.32	VII.

NAME.	Mag.	R. A. 1875.0.	Annual variation in R. A.	N. P. D. 1875.0.	Annual variation in N. P. D.	Greenwich Catalogues.
		h. m. s.	s.	° ′	′	
B. F. 75..... P. 0, 189	6	0 41 49	+3.13	85 21.7	−0.31	A, XII, VI, (VII), IX.
W. B. (2) 0, 1057	7.8	0 42 9	3.28	49 32.9	0.33	XII, IX.
LL, 1307.....	7.5	0 42 10	3.22	57 45.4	0.33	A, XII.
W.B.(2) 0, 1062.	7.8	0 42 24	3.28	49 35.9	0.33	XII, IX.
VI, 49.....	....	0 43 7	3.02	102 26.1	0.33	VI, VII.
BR. 82.....	6	0 43 9	3.57	26 25.9	0.33	A, XII.
65 i^1 Pisc. (1st star)	....	0 43 10	3.20	62 58.2	0.33	(VII).
65 i^2 Pisc. (2nd star)	6 ...	0 43 11	3.20	62 58.3	0.33	(VII).
BR. 74.....	6	0 43 19	5.17	6 58.3	0.33	A, XII, (VII), IX.
BR. 91.....	6.7	0 44 52	3.08	87 17.6	0.33	IX.
W. B.0, 775....	8	0 45 29	3.09	86 37.1	0.33	IX.
BR. 90.....	6	0 45 37	3.53	29 33.7	0.33	A, XII, IX.
GR. 163	7	0 46 13	3.37	41 1.3	0.33	VII.
P. 0, 216.....	8	0 46 53	3.08	86 35.5	0.33	(VII), IX.
W.B. 0, 806 ...	9	0 47 14	3.08	88 46.2	0.33	(VII).
GR. 171.....	5	0 47 59	3.38	41 59.9	0.33	VI, VII, (VII), IX.
W. B. 0, 834...	9	0 49 16	3.02	101 25.1	0.33	VI, VII.
BR. 65	6	0 49 40	13.12	1 38.8	0.33	VI, IX.
A, 43.....	....	0 59 30	3.24	59 14.5	0.33	A, XII.
LL. 1611	7	0 50 31	3.22	63 40.6	0.33	(VII).
A, 44.....	....	0 50 32	3.24	59 15±	0.33	A.
A, 45.....	....	0 50 37	3.24	59 21.3	0.33	A, XII.
GR. 192.....	6	0 50 38	3.72	24 21.4	0.33	IX.
W. B. 0, 871...	8	0 51 16	3.08	88 35.1	0.33	(VII.)
VI, 57.....	....	0 51 41	3.02	100 33±	0.33	VI.
P. 0, 246	7	0 51 50	3.10	83 49.9	0.32	IX.
W. B. 0, 907 ...	9	0 53 12	+3.07	91 52.2	−0.33	VI.

NAME.	Mag.	R. A. 1875.0.			Annal variation in R. A.	N. P. D. 1865.0.		Annual variation in N. P. D.	Greenwich Catalogues.
		h.	m.	s.	s.	°	′	′	
BR. 107.....	6.7	0	53	21	+3.11	84	11.5	−0.32	(VII), IX.
XII, 63.....	....	0	54	26	3.06	91	41.6	0.33	XII.
W. 0, 953.....	9	0	55	20	3.01	100	54.9	0.33	XII.
BR. 95.....	6	0	55	30	8.11	3	31.3	0.32	VII, IX.
LL. 1784.....	8	0	55	33	3.08	88	9.0	0.32	(VII).
GR. 215.....	6	0	55	53	4.17	16	18.0	0.32	VII, (VII), IX.
GR. 219.....	6.7	0	55	56	3.64	29	35.8	0.32	IX.
W. B. 0, 973...	9	0	56	30	3.08	88	19.7	0.32	(VII).
W. B. 0, 976...	9	0	56	41	3.01	100	32.3	0.32	XII, VI.
BR. 112...	7	0	56	55	3.50	36	28.0	0.32	(VII).
GR. 232.....	6	0	57	35	3.34	50	40.9	0.32	A, XII.
BR. 114.....	7.8	0	57	50	3.80	24	42.0	0.32	(VII).
LL. 1879.... ..	7	0	58	18	3.08	88	21.4	0.32	(VII).
GR. 234.....	6.7	0	58	31	3.71	27	54.4	0.32	IX.
BR. 109	6	0	58	37	4.87	10	39.3	0.32	IX.
BR. 122.....	6	0	59	0	3.21	69	12.3	0.32	(VII).
LL. 1904.....	9	0	59	17	3.08	88	11.7	0 32	(VII).
BR. 125.....	8	0	59	25	3.10	85	45.3	0.32	VII, IX.
P. 0, 285...	7	0	59	56	3.46	41	6.9	0.32	VII.
A, 51.....	....	1	0	58	3.35	51	25.0	0.32	A, XII.
BR. 117.....	6	1	1	33	4.90	10	59.5	0.32	(VII), IX.
LL. 1985.... ..	7	1	2	25	3.94	22	53.4	0.32	A, XII.
W. B. I, 8.....	9	1	2	47	3.08	88	6.9	0.32	(VII).
(VII), 147.....	9	1	3	10	3.09	87	3.8	0.32	(VII).
{B. F. 119 / BR. 138} ...	6.5	1	3	22	3.82	26	27.8	0.32	A, XII.
A, 58.....	....	1	3	25	+3.36	51	23.4	−0.32	A, XII.

NAME.	Mag.	R. A. 1875.0.	Annual variation in R. A.	N P D. 1875.0	Annual variation in R. A.	Greenwich Catalogues.
		h. m. s.	s.	° ′	′	
A, 59	....	1 3 30±	+3.36	51 25.5	−0.32	A, XII.
P. 0, 311	6	1 3 34	3.18	74 59.5	0.32	VII.
LL. 2089	9	1 4 1	3.08	88 6.7	0.32	(VII.)
P. I, 9	6	1 5 20	3.46	45 19.7	0.32	XII, (VII.)
W. 1, 51	8	1 5 24	3.01	98 35.6	0.32	XII.
BR. 137	6.7	1 5 32	5.04	10 45.3	0.32	(VII), IX.
LL. 2145	9	1 6 6	3.38	51 35.6	0.32	A, XII.
BR. 153	7	1 6 7	3.29	60 35.9	0.32	(VII.)
(VII), 161	9	1 6 37	3.09	87 44.2	0.32	(VII.)
86 ζ^1 Pisc. (1st star)	5.4	1 7 12	3.12	83 5.2	0.32	VII, (VII.), IX.
86 ζ^2 Pisc. (2d star)	5.4	1 7 13	3.12	83 5.0	0.32	VII, (VII.) IX.
B. F. 143 / BR. 159	7	1 7 14	3.13	83 5.0	0.32	XII.
LL. 2195	8½	1 7 38	3.38	51 12.7	0.32	A, XII.
W. I, 98	8	1 8 12	3.03	95 42.2	0.32	XII.
LL. 2259	7	1 9 15	3.14	80 52.7	0.32	(VII.)
(VII), 169	....	1 9 23	3.09	87 1.9	0.32	(VII.)
XII, 91	....	1 9 30±	3.03	95 16.3	0.32	XII.
W. I. 122	8.9	1 9 49	3.03	95 36.6	0.32	XII.
XII, 93	....	1 9 50±	3.03	95 42.3	0.32	XII.
W. I, 126	8	1 10 11	3.03	95 29.±	0.32	XII.
XII, 95	...	1 10 29	3.37	52 25.3	0.32	XII, VI.
W. B. I, 135	9	1 10 40	3.14	80 3.7	0.32	IX.
IX, 118	10	1 10 43	3.13	81 46.2	0.32	IX.
(VII), 173	Var	1 11 2	3.13	81 43.7	0.32	(VII.)
W. I, 147	8	1 11 3	3.03	96 17.5	0.32	XII.
(VII), 174	9	1 11 18	3.09	87 31.2	0.32	(VII.)
BR. 163	7	1 11 53	+4 70	14 25.0	−0.32	A, XII.

NAME.	Mag.	R. A. 1750.0.			Annual variation in R. A.	N. P. D. 1875.0.		Annual variation in N. P. D.	Greenwich Catalogues.
		h.	m.	s.	s.	°	′	′	
P. I, 85.....	7½	1	12	1	+3.73	32	27.0	—0.32	A, XII.
1 Ursae Min.... (1st star.)	9.10	1	12	30	20.40	1	21.7	0.32	A, XII, VI, VII, (VII).
35 Cassiopeiae.. (1st star)	8.7	1	12	44	3.95	25	59.0	0.32	(VII.)
35 Cassiopeiae.. (2d star.)	6.7	1	12	46	3.95	25	59.9	0.32	(VII.)
BR. 166.....	6	1	12	50	5.07	11	55.8	0.32	(VII)
P. I, 44	7.8	1	12	56	3.09	87	23.1	0.32	(VII.)
1 α Ur. Min.....	2	1	12	59	20.81	1	21.4	0.32	A, XII, VI, VII, (VII).
(VII), 182.....	....	1	13	17	3.09	86	57.2	0.32	(VII.)
W. B. I, 206	8	1	14	30	3.06	91	58.1	0.32	VII, (VII).
W. I, 223	8.9	1	15	21	3.04	94	5.5	0.32	XII.
W. B. I, 229	9	1	15	51	3.09	87	8.2	0.32	(VII.)
A, 69.....	....	1	16	12	3.38	54	8.2	0.32	A, XII.
W. I, 237	8	1	16	13	3.04	94	27.2	0.32	XII.
P. I, 56	6.7	1	16	32	3.36	56	24.7	0.32	A, XII.
(VII), 189.....	....	1	16	38	3.18	75	32.1	0.32	(VII.)
A, 72	....	1	16	50±	3.03	95	47.8	0.32	A, XII.
LL ..... {2528 2529}	8	1	18	3	3.38	54	55.0	0.32	A, XII.
W. I, 271	7	1	18	3	3.01	97	33.9	0.32	XII.
W. I, 283	8	1	18	31	3.01	97	38.0	0.32	XII.
P. I, 69.....	6	1	18	58	3.49	47	11.5	0.31	VII.
P. I, 70.....	6	1	19	1	3.37	56	3.9	0.32	A, XII.
BR. 187	7	1	19	38	3.24	70	34.8	0.31	IX.
A, 77.....	....	1	20	0	3.37	56	16.6	0.31	A, XII.
BR. 191	6.7	1	20	3	3.07	91	3.0	0.31	(VII.)
W. B. I, 330	8.9	1	20	49	3.10	86	50.6	0.31	(VII.)
XII, 116.....	....	1	21	6	3.06	91	51.0	0.31	XII.
W, B. I, 335	9	1	21	7	+3.10	86	46.3	—0.31	(VII.)

NAME.	Mag.	R. A. 1875.0.			Annual variation in R. A.	N. P. D. 1875.0.		Annual variation in N. P. D.	Greenwich Catalogues.
		h.	m.	s.	s.	°	′	′	
W. B. I, 343.....	9	1	21	36	+3.05	92	38.2	—0.31	XII, VI.
W. B. I, 346.....	8	1	21	39	3.05	92	41.3	0.32	XII, VI.
A, 78..... ..	...	1	21	50	3.38	55	44.0	0.31	A, XII.
P. I, 90.....	6.7	1	22	30	3.29	65	22.4	0.31	IX.
BR. 193.....	7	1	23	19	4.36	20	37.6	0.31	IX.
P. I, 88.....	6	1	23	23	4.26	22	14.1	0.31	IX.
W. B. I, 375....	8.9	1	23	29	3.07	90	16.5	0.31	XII, VI.
A, 80.....	....	1	23	47	3.38	56	28.5	0.31	A, XII.
BR. 201.....	6	1	23	48	2.83	116	16.0	0.31	A, XII.
VII, 97.....	10	1	24	2	3.09	87	40.6	0.31	VII, (VII).
VI, 83.....	11	1	24	11	3.09	87	45.8	0.31	VI, VII.
GR. 329.....	6	1	24	14	4.01	27	3.1	0.31	IX.
VII, 99.....	10	1	24	19	3.09	87	45.1	0.31	VII.
W. B. I, 400....	9	1	24	46	3.09	87	45.5	0.31	VII, (VII).
BR. 204.....	8	1	25	19	3.22	73	41.4	0.31	(VII).
B. A. C. 458....	6	1	25	42	2.78	120	37.8	0.31	VI, VII.
VI, 87.....	....	1	26	44	3.08	88	51±	0.31	VI.
P. I, 107.....	6.7	1	26	46	3.13	82	26.0	0.33	IX.
XII, 126.....	....	1	27	2	3.12	84	4.5	0.31	XII, VI.
BR. 195.....	6	1	27	3	6.13	9	12.5	0.31	(VII).
P. I, 104.....	6	1	27	4	3.45	53	24.3	0.31	(VII), IX.
W. B. I, 452....	9	1	27	29	3.09	88	4.6	0.31	XII, VI.
XII, 127.....	....	1	27	30±	3.08	88	49.6	0.31	XII.
XII, 128.....	....	1	27	30±	3.09	88	5.1	0.31	XII.
A, 85.....	....	1	27	52	3.38	57	31.1	0.31	A, XII.
P. I, 110.....	6.7	1	28	4	3.25	72	10.7	0.31	IX.
W. B. I, 467...	8.9	1	28	15	3.12	84	3.2	0.31	XII, VI.
P. I, 114.....	7.5	1	28	19	+3.13	82	22.0	—0.31	IX

NAME.	Mag.	R. A. 1875.0.	Annual variation in R A.	N. P. D. 1875.0.	Annual variation in N. P. D.	Greenwich Catalogues.
		h. m. s.	s.	° ′	′	
B. F. 185.....	7.5	1 28 22	+3.07	89 41.1	—0.31	XII, VI.
VI, 93.....	....	1 28 40±	3.08	88 52.9	0.31	VI.
VI, 94.....	....	1 28 41	3.08	88 51±	0.31	VI.
BR. 207.....	6	1 28 49	3.63	41 55.0	0.31	XII, VI, (VII), IX.
P. I, 120.....	6	1 29 9	3.23	73 12.4	0.31	VII, (VII).
BR. 205.....	7	1 29 20	5.33	12 40.1	0.31	IX.
P. I, 123.....	6.7	1 29 30	3.14	83 59.7	0.31	IX.
B. A. C. 482....	6	1 29 58	3.87	32 39.6	0.31	VI, VII.
P. I, 121.....	7	1 30 4	3.63	42 13.6	0.31	IX.
BR. 217.....	7.8	1 31 2	3.18	78 33.6	0.31	A, XII, VI, VII, (VII).
W. B. I, 564...	9	1 33 18	3.06	93 9.0	0.31	VI.
P. I, 144.....	7	1 34 0	3.14	81 52.4	0.31	A, XII.
BR. 222.....	7	1 34 1	3.91	32 0.3	0.31	A, XII.
P. I, 142.....	6	1 34 11	3.63	48 0.9	0.31	VII, (VII), IX.
P. I, 139.....	7	1 34 11	4.02	30 5.1	0.31	A, XII, IX.
W. I, 594.....	8	1 34 26	3.04	93 15.1	0.31	XII.
BR. 225.....	6.7	1 34 35	3.38	60 35.1	0.31	(VII).
W. B. (2) I, 774.	6	1 34 50	3.44	55 23.2	0.31	(VII), IX.
A, 95.....	....	1 35 7	3.38	59 29.5	0.31	A, XII.
A, 97.....	....	1 35 50	3.38	59 36.1	0.31	A, XII.
P. I, 157.....	6	1 36 31	2.74	122 57.3	0.31	XII, VI, VII.
VI, 103.....	....	1 36 34	3.17	80 0.6	0.31	VI.
Arg. Zone +8° No. 268.....	8.9	1 37 30	3.15	81 45.1	0.30	IX.
P. I, 159.....	6.7	1 38 44	4.26	26 45.9	0.30	XII, IX.
A, 99.....	....	1 38 50±	3.10	87 12.7	0.30	A, XII.
A, 100.....	...	1 39 0±	3.38	60 57.3	0.30	A, XII.
LL. {3230 3231} ...	8	1 39 27	3.10	87 14±	0.30	VI.
VII, 118.....	....	1 39 31	+3.04	93 25.6	—0.30	VII.

NAME.	Mag.	R. A. 1875.0.	Annual variation in R. A.	N P D. 1875.0.	Annual variation in N. P. D.	Greenwich Catalogues.
		h. m. s.	s.	° ′	′	
Ll. 3225.....	8½	1 39 36	+3.38	61 0.9	—0.30	A, XII, VI.
VI, 119.....	....	1 39 43	3.04	93 25.7	0.30	VII.
P. I, 169.....	7½	1 40 31	3.17	79 46.9	0.30	VI.
A, 103.....	8	1 41 12	3.07	90 28.3	0.30	A, XII.
P. I, 170.....	6	1 41 17	3.57	52 40.3	0.30	(VII), IX.
A, 104	....	1 41 20	3.38	61 4.5	0.30	A, XII.
BR. 236.....	8	1 41 35	3.24	73 36.2	0.30	(VII).
P. I, 175.....	6.7	1 41 58	3.11	86 56.4	0.30	(VII).
BR. 230..... ...	7	1 42 20	5.74	12 25.3	0.30	IX.
W. B. I. 743....	8	1 42 35	3.16	81 20.9	0.30	VI.
1 Arietis..... (1st star)	6	1 43 14	3.31	68 20.8	0.30	(VII).
1 Arietis..... (2d star)		1 43 14	3.31	68 20.9	0.30	(VII).
P. I, 182.....	7.8	1 43 15	2.95	101 19.4	0.30	XII, VI.
BR. 240.....	6.7	1 44 52	3.79	39 8.6	0.30	(VII.)
W. B. I, 790...	8	1 45 16	3.04	93 15.4	0.30	VII, (VII.)
5γ Arietis.... (N. star.)	4.3	1 46 40	3.28	71 19.2	0.30	A, XII.VII, (VII.)
5γ Arietis.... (as one mass.)		1 46 40	3.23	71 19.1	0.30	XII.
5γ Arietis.... (S. star.)		1 46 41	3.28	71 19.0	0.30	A, XII,VII, (VII.)
W. B. I, 824....	9	1 47 3	3.10	87 20.6	0.30	VI.
BR. 253.....	....	1 48 31	3.53	53 20.2	0.30	(VII), IX.
BR. 246.....	6	1 50 23	5.82	12 41.5	0.30	IX.
B. F. 222.....	6	1 50 26	4.31	25 59.2	0.30	A, XII.
9λ¹ Arietis.... (1st star.)	5	1 50 58	3.33	67 0.8	0.30	(VII.)
9λ² Arietis.... (2d star.)		1 51 0	3.33	67 0 4	0.30	(VII.)
P. I, 222.....	6	1 52 40	3.32	69 33.0	0.29	VII.
P. I, 223	6	1 52 44	3.20	78 18.7	0.29	IX.
VI, 122.....	....	1 55 10	+3.10	86 55.3	—0.29	VI.

NAME.	Mag.	R. A. 1875.0.			Annual variation in R. A.	N. P. D. 1875.0.		Annual variation in N. P. D.	Greenwich Catalogues.
		h.	m.	s.	s.	°	′	′	
113 α^1 Piscium	....	1	55	35	+3.10	87	50.4	−0.29	VI, IX.
113 α Piscium (As one mass.)	3.4	1	55	35	3.10	87	50.4	0.29	VI.
113 α^2 Piscium	....	1	55	35	3.10	87	50.4	0.29	VI, IX.
W. B. I, 974....	9	1	55	44	3.03	93	11.3	0.29	A, XII, VI.
VII, 133.....	....	1	56	13	3.20	79	6.8	0.29	VII.
57 γ^1 Andromedae ..... (1st star.)	2.3	1	56	14	3.65	48	16.3	0.29	A, XII, VI, VII, (VII), IX.
57 γ Andromedae ..... (As one mass)	....	1	56	15	3.65	48	16.3	0.29	(VII).
57 γ^2 Andromedae ..... (2nd star.)	5	1	56	15	3.65	48	16.2	0.29	A, XII, VI, VII, (VII), IX.
W. B. I, 986....	9	1	56	19	3.05	92	13.6	0.29	VI.
W. B. I, 990....	7	1	56	32	3.04	92	58.8	0.29	VI, VII, (VII).
W. I. 988.....	9	1	56	36	3.20	78	57.0	0.29	XII, VI, VII
P. I, 243.....	6.7	1	56	52	3.29	72	20.9	0.29	VII, (VII) IX.
BR. 279.....	7.8	1	57	16	3.38	64	40.9	0.29	(VII).
Á, 122.....	....	1	57	59	3.34	67	2.7	0.29	A, XII.
BR. 284.... ...	6	1	59	38	3.38	64	46.0	0.29	(VII).
BR. 283.....	5½	1	59	58	4.13	32	10.3	0.29	A, XII.
XII, 187.....	....	2	0	40	3.28	72	39.5	0.29	XII.
P. I, 257.....	7	2	0	54	3.28	72	34.0	0.29	XII.
BR. 282.....	6.7	2	1	53	5.35	16	33.7	0.29	IX.
BR. 294.....	6	2	3	19	3.61	51	32.8	0.29	(VII).
VI, 135.....	....	2	5	30	3.12	85	59.9	0.29	VI.
LL. {4047 4048} ...	6	2	6	3	3.82	43	5.8	0.29	XII, VI.
66 Ceti ..... (1st star.)	....	2	6	24	+3.07	92	58.8	−0.29	(VII).

Name.	Mag.	R. A. 1875.0.			Annual variation in R.A.	N. P. D. 1875.0		Annual variation in N. P. D.	Greenwich Catalogues.
		h.	m.	s.	s.	°	′	′	
66 Ceti (2d star).	6.7	2	6	24	+3.07	92	58.7	—0.29	(VII).
Br. 309.....	7.8	2	6	56	3.32	76	58.4	0.28	(VII).
P.II, 21.....	7½	2	8	4	4.15	33	33.1	0.29	A, XII.
P. II, 22.... ...	7	2	8	9	4.15	33	31.8	0.28	A, XII.
VII, 143	....	2	8	13	3.24	76	46.7	0.28	VII, (VII), IX.
VII, 144	....	2	8	29	3.26	74	51.1	0.28	VII, (VII).
R Arietis.....	Var	2	9	1	3.40	65	31.5	0.28	(VII), IX.
A, 134...	....	2	9	8	3.33	69	52.8	0.28	A, XII.
W. B. II, 109..	8	2	9	7	3.27	74	45.7	0.28	VII, (VII).
Br. 307.....	7½	2	9	10	4.50	26	9.4	0.28	A, XII.
Br. 313	7½	2	10	39	4.55	26	14.6	0.28	A, XII.
W. B. II, 158..	7	2	12	5	3.17	82	23.9	0.28	VI.
Br. 325	6	2	12	37	3.85	43	15.9	0.28	(VII).
Br. 323	7	2	13	8	4.35	33	19.9	0.28	A, XII, VI.
Br. 328	8	2	14	9	4.18	33	11.1	0.28	A, XII, VI.
VII, 150.....	....	2	14	57	3.28	74	16.8	0.28	VII.
P. II, 61.....	6	2	15	4	3.72	49	10.3	0.28	(VII), IX.
Arg. Zone+1°, No. 417	8.9	2	15	48	3.10	88	7.2	0.28	IX.
F. 298	6.7	2	16	32	3.21	79	44.1	0.28	IX.
Br. 336	8	2	17	29	3.19	80	17.6	0.29	(VII).
Ll. 4458.....	6.7	2	17	49	2.67	117	33.7	0.29	VII, (VII), IX.
P. II, 75	6½	2	17	50	3.19	80	51.1	0.28	VI.
Br. 332	4	2	18	48	4.84	23	9.7	0.27	A, XII, VI, VII, (VII), IX.
B. A. C., 744, (1st star).	....	2	18	50±	4.85	23	9.6	0.28	VII.
VII, 156.....	....	2	18	49	4.85	23	9.7	0.27	VII, (VII), IX.
B. A. C., 744, (3rd star).	....	2	18	49	4.83	23	9.6	0.28	VII.
P. II, 83	7	2	19	28	+3.21	79	55.1	—0.27	VI, IX.

NAME.	Mag.	R. A. 1875.0.	Annual variation in R. A.	N P D. 1875.0.	Annual variation in N. P. D.	Greenwich Catalogues.
		h. m. s.	s.	° ′	′	
*P. II, 60	6	2 19 42	+7.95	8 54.7	−0.28	(VII.), IX.
BR. 341	6	2 20 3	3.20	80 0.1	0.27	VI, IX.
W. B. II, 306..	9	2 20 6	3.20	79 58.9	0.27	VI.
Arg. Zone +1°, No. 428	9	2 20 37	3.10	88 4.7	0.27	IX.
GR. 518	6	2 23 12	3.69	51 25.4	0.28	XII.
LL. 4594	8	2 23 11	3.62	54 26.4	0.27	VI.
W. B. II. 383 ..	9	2 24 7	3.26	76 35.8	0.27	VII.
P. II. 100	7.8	2 24 46	4.08	38 14.7	0.27	XII.
RADCLIFFE 713.	8	2 25 22	16.02	3 29.9	0.27	VII, IX.
BR. 348	6.5	2 26 12	5.55	17 43.8	0.27	VII, IX.
W. B. II, 417 ..	9	2 26 21	3.17	82 39.8	0.27	VI.
BR. 355	6.7	2 26 37	3.34	71 40.3	0.27	(VII).
P. II, 115	6.7	2 28 14	4.10	38 35.2	0.27	XII, IX.
P. II, 117	8	2 28 15	3.62	55 49.3	0.27	(VII), IX.
Arg. Zone +2°, No. 400	8	2 28 22	3.10	87 53.8	0.27	IX.
VI, 156	....	2 28 27	3.26	76 52.7	0.27	VI.
P. II, 118	6.7	2 28 27	3.17	83 4.4	0.27	VI, VII.
VI, 158	....	2 28 34	3.26	76 56.5	0.27	VI.
W. II, 459	9	2 28 34	2.88	103 18.0	0.27	A, XII.
W. B. II, 453...	9	2 28 34	3.16	83 43.3	0.27	VII, (VII), IX.
P. II, 123	6	2 29 14	3.28	83 42.6	0.29	A., XII, VI, VII, IX.
80 Ari. (1st star)	6	2 29 45	3.44	65 53.8	0.27	A, XII.
80 Ari. (2d star)	6	2 29 48	3.44	65 53.8	0.27	A, XII.
BR. 344	6	2 29 55	8.18	9 4.9	0.27	A, XII, VI.
W. B. II, 497..	8	2 30 20	2.88	103 26.7	0.27	XII, VI.
BR. 353	7	2 30 20	5.44	18 54.8	0.26	(VII), IX.
BR. 358	7	2 31 40	+5.08	22 28.4	−0.26	(VII.)

* Not in D. M. Greenwich place agrees w ith Carrington.

NAME.	Mag.	R. A. 1875.0.	Annual variation in R. A.	N. P. D. 1875.0.	Annual variation in N. P. D.	Greenwich Catalogues.
		h. m. s.	s.	° ′	′	
Arg. zone + 2° No. 407.....	9	2 32 26	+3.11	87 28.8	−0.26	IX.
Arg. zone + 2° No. 410.....	8	2 33 40	3.11	87 37.1	0.26	IX.
P. II, 148.....	6	2 33 40	3.16	84 24.4	0.26	A, XII, VI.
BR. 366.....	6.7	2 34 6	5.06	22 42.5	0.26	VII, (VII), IX.
Arg. zone + 2° No. 412.....	8	2 34 18	3.11	87 38.4	0.26	IX.
BR. 379.....	7	2 35 17	3.22	79 59.4	0.26	(VII).
BR. 381.....	6	2 35 45	3.22	79 47.5	0.26	VI, VII, IX.
LL. {5033 / 5034}	8	2 36 40±	3.33	72 59.1	0.26	A, XII.
γ^1 Ceti.....	7	2 36 49	3.11	87 17.5	0,26	VII, (VII), IX.
86 γ^2 Ceti	3.4	2 36 50	3.10	87 17.5	0.26	VII, (VII), IX.
BR. 373.....	8	2 37 43	5.33	20 53.6	0.26	A, XII.
GR. 551.....	....	2 37 51	4.05	40 52.5	0.26	VII.
RADCLIFFE 745.	8.9	2 39 33	28.04	1 57.7	0.26	VII.
W. B. (2) II, 927.	8	2 39 40	3.72	52 44.0	0.26	IX.
GR. 554.....	7	2 40 2	4.37	33 29.4	0.26	VI, VII.
LL. 5065.....	9	2 40 7	5.25	21 41±	0.26	XII.
GR. 556	6.7	2 40 18	4.38	33 26.3	0.26	VI, VII.
BR. 382.....	6.7	2 40 51	5.24	21 37.9	0.26	A, XII, IX.
15 ^{1} Persei	4.3	2 41 25	4.31	34 38±	0.26	VI.
15 η^2 Persei	4.3	2 41 28	4.31	34 37.4	0.26	VI.
BR. 391.....	6.5	2 41 30	3.48	65 20.0	0.26	(VII).
XII, 243.....	....	2 42 32	5.28	21 32±	0.26	XII.
BR. 403 (1st star)	....	2 46 3	3.16	84 2.3	0.25	(VII).
BR. 403 (as one mass).	8	2 46 3	3.16	84 2.3	0.25	(VII).
BR. 403 (2d star)	....	2 46 3	+3.16	84 2.3	−0.25	(VII).

Name.	Mag.	R. A. 1875.0.	Annual variation in R. A.	N. P. D. 1875.	Annual variation in N. P. D.	Greenwich Catalogues
		h. m. s.	s.	° ′	′	
P. II, 203.....	7	2 46 14	+3.33	74 1.6	−0.25	VI, VII.
W. B. II, 790..	8	2 47 4	3.21	81 10.5	0.25	IX.
Gr. 579.....	7.8	2 47 8	4.02	43 12.3	0.25	(VII.)
Gr. 585.....	6	2 48 7	4.02	43 20.6	0.25	(VII.)
Br. 410.....	6.7	2 49 33	3.20	82 7.3	0.25	VI, VII.
Br. 392.....	6	2 49 34	7.68	11 4.6	0.25	VI (VII), IX
Radcliffe 840..	6	2 50 7	3.78	51 53.3	0.25	IX.
Gr. 590.....	5½	2 51 22	4.04	43 16.8	0.25	XII.
{ B. F. 373 Br. 414 }	7	2 51 43	3.42	68 53.9	0.25	XII.
Br. 396.....	6	2 52 28	3.80	9 0.9	0.25	(VII.)
Br. 416.....	7.8	2 53 27	3.74	54 22.8	0.24	(VII.)
Gr. 598.....	7	2 53 56	3.80	51 37.1	0.24	IX.
Ll. 5612.....	7½	2 55 9	2.71	111 11.5	0.24	XII, VI.
P. II, 248.....	6	2 56 14	2.58	118 34.2	0.24	VI, VII.
W. B. II, 986..	7	2 56 52	3.17	84 15.8	0.24	IX.
XII, 261.....	....	2 57 41	2.72	110 42.8	0.24	XII.
Ll. 5706.....	8	2 58 8	2.70	111 51.0	0.24	XII, VI.
XII, 263.....	....	2 58 25	2.71	111 12.4	0.24	XII.
Br. 417.....	5.4	2 58 26	6.30	16 5.1	0.24	IX.
Ll. 5728.....	9	2 58 58	2.69	111 53.8	0.24	VI.
IX, 284.....	8	2 59 32	3.82	51 23.8	0.24	IX.
Gr. 612.....	7	3 1 47	6.26	16 36.3	0.23	IX.
P. II, 261.....	7	3 2 10	3.43	69 43.2	0.23	VII, (VII.)
VI, 198.....	....	3 2 11	2.67	112 56.0	0.24	VI
W. B. II, 1090..	8	3 2 24	2.90	100 1.4	0.24	XII, VI.
Br. 444.....	6.7	3 3 2	+3.55	63 35.1	−0.23	(VII.)

NAME.	Mag.	R. A. 1875.0.			Annual variation in R. A.	N P D. 1875.9.		Annual variation in N. P. D.	Greenwich Catalogues.
		h.	m.	s.	s.	°	′	′	
BR. 402	6	3	3	4	+12.95	5	32.2	−0.23	(VII), IX.
W. B. III, 23	8.9	3	3	38	2.90	100	3.2	0.23	XII, VI.
VI, 201	....	3	3	53	3.32	75	20.5	0.23	VI.
XII, 270	....	3	4	8	3.32	75	27. ±	0.23	XII.
BR. 431	5.6	3	4	32	7.31	12	43.7	0.23	VII, (VII), IX.
BR. 442	6.7	3	5	21	5.23	24	5.2	0.23	(VII), IX.
BR. 437	8	3	5	47	6.62	15	13.5	0.23	(VII), IX.
BR. 445	7.8	3	6	36	5.17	24	48.4	0.23	(VII), IX.
P. III, 5	6	3	6	40	3.96	47	57.9	0.23	(VII).
VI, 204	....	3	6	58	3.04	91	43.0	0.23	VI.
VI, 207	....	3	7	57	3.41	70	45.6	0.23	VI.
GR. 628	6	3	8	8	5.66	20	43.7	0.23	XII, VII, IX.
BR. 448	5	3	9	1	5.18	24	48.4	0.23	A, XII, VII, (VII), IX.
W. B. (2) III, 157	7.8	3	9	2	3.90	49	58.7	0.23	IX.
W. B. (2) III, 158	8	3	9	2	3.90	49	58.6	0.23	IX.
BR. 456	7.8	3	9	27	2.91	99	14.0	0.23	VI, VII.
W. B. III, 139	9	3	9	31	3.30	76	36.6	0.23	VII.
GR. 639	6.7	3	9	40	3.86	51	10.6	0.23	(VII), IX.
P. III, 23	5	3	10	55	3.74	56	14.1	0.22	(VII), IX.
W. B. III, 168	8	3	10	58	3.31	76	36.7	0.23	VII.
BR. 449	6.7	3	12	27	6.27	17	14.3	0.22	IX.
B. F. 416 / P. III, 32	....	3	12	47	3.63	61	24.5	0.22	A, XII.
LL. 6129	8	3	12	56	3.38	72	57.4	0.22	VI, VII, (VII).
LL. 6094	9	3	13	4	4.86	29	10.0	0.23	VI.
RUEMKER 842	....	3	13	32	3.35	74	7.3	0.22	VI.
P. III, 38	6.7	3	13	40	3.44	69	56.6	0.22	IX.
P. III, 27	6	3	13	51	+5.14	25	51.7	−0.22	IX.

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		h. m. s.	s.	° ′	′	
Carrington 479	10.9	3 16 3	+9.52	8 53.5	−0.22	IX.
Gr. 655..... ...	9	3 16 18	4.22	41 11.6	0.22	VII.
VI, 217.....	....	3 17 8	4.25	40 38.6	0.22	VI, VII.
Gr. 660.....	7.8	3 17 9	4.24	40 41.9	0.22	VI, VII, IX.
Br. 475.....	7.8	3 17 19	3.48	68 24.3	0.22	(VII).
Carrington 484	10.9	3 17 54	9.55	8 55.4	0.22	IX.
XII, 287.....	....	3 18 23	4.80	30 29±	0.22	XII.
P. III, 52.....	7.8	3 18 44	4.25	40 50.3	0.22	VII.
P. III, 51.....	5.4	3 18 58	4.80	30 29.8	0.22	A, XII, VI, VII, (VII).
P. III, 54.....	5	3 19 57	4.74	31 33.4	0.22	XII, VI, IX.
W. B. III, 334..	7	3 20 26	3.29	77 42.1	0.22	VII.
P. III, 57.....	5	3 20 29	4.54	34 59.0	0.21	(VII), IX.
Ll. 6361.....	8	3 20 35	3.37	73 46.4	0.22	VI.
Br. 471.....	6	3 21 33	6.42	17 4.8	0.21	VII, (VII), IX.
Br. 480.....	6	3 21 48	4.21	42 19.7	0.21	(VII).
VI, 226.....	....	3 21 52	3.24	80 40.0	0.21	VI, VII.
Gr. 689.....	8	3 22 24	4.26	40 58.4	0.21	VII.
Gr. 693.....	7	3 22 53	4.26	41 1.7	0.21	VII.
Br. 483.....	6	3 23 19	4.20	42 24.3	0.21	(VII).
VI, 227.....	8.9	3 23 22	3.30	77 31.7	0.21	XII, VI, VII, (VII).
Gr. 698.....	7.8	3 23 45	4.02	47 40.8	0.21	(VII), IX.
XII, 297.....	....	3 24 58	2.91	98 32.2	0.21	XII, VI.
Gr. 642.....	6	3 25 45	19.15	3 45.1	0.21	XII, VI, VII, (VII), IX.
P. III, 87.....	6.7	3 27 1	3.38	72 34.7	0.20	VII, (VII), IX.
Br. 490.....	7	3 27 14	3.72	58 24.1	0.21	(VII).
Br. 492.....	6.7	3 27 51	3.70	58 44.3	0.21	(VII).
(VII), 443.....	9	3 28 31	3.68	59 49.5	0.21	(VII).
Gr. 713.	6	3 29 33	+ 4.03	47 49.9	−0.20	(VII).

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		h.	m.	s.	s.	°	′	′	
W. B. III, 540..	9.10	3	30	22	+3.08	89	49.4	—0.20	(VII).
BR. 496	6.7	3	30	23	3.08	89	49.4	0.19	(VII).
W. III, 609.....	7	3	33	27	2.87	100	50.5	0.20	XII.
GR. 717.....	6	3	30	33	4.03	47	52.2	0.20	(VII).
P. III, 94.....	6	3	31	20	5.14	27	11.5	0.20	XII, VI, VII, (VII), IX.
VII, 248.....	....	3	31	36	3.63	62	27.3	0.20	VII.
P. III, 103.....	6	3	32	22	3.39	73	52.3	0.20	IX.
P. III, 104	6	3	33	0	3.91	52	49.5	0.20	(VII), IX.
W. III, 623.....	7	3	34	8	2.89	99	26.7	0.20	XII.
P. III, 102.....	6	3	34	12	5.61	23	11.6	0.20	(VII), IX.
P. III, 105	6.5	3	35	8	5.19	27	3.1	0.20	A, XII.
RADCLIFFE 1043	7.8	3	35	15	4.05	47	47.3	0.20	IX.
W. III, 650.....	9	3	35	24	3.00	99	35.8	0.20	XII.
W. B. III, 680..	9	3	36	49	2.86	100	54.2	0.20	VI, VII.
P. III, 128.....	6	3	37	12	3.48	69	28.0	0.19	IX.
P. III, 138.....	6	3	37	36	2.87	100	52.9	0.19	XII, VI, VII, (VII), IX.
P. III, 121.....	5	3	38	6	5.42	24	51.8	0.19	IX.
P. III, 135.....	7.8	3	38	12	3.55	66	3.5	0.19	(VII).
W. III, 715.....	8	3	38	30	2.90	98	59.1	0.19	XII.
W. B. III, 758*.	8.9	3	40	36	2.88	99	50.0	0.19	XII, VI.
W. B. III, 760..	8	3	40	50	2.88	99	46.6	0.19	XII, VI.
BR. 522.....	7	3	40	57	3.54	66	57.9	0.19	(VII).
BR. 523.....	7	3	41	4	3.56	66	2.4	0.19	(VII).
P. III, 169.....	6	3	41	20±	2.45	119	43.7	0.19	XII.
GR. 743.....	6	3	41	23	4.15	45	25.0	0.19	(VII).
W. B. III, 767 ..	8.9	3	41	32	3.27	79	35.3	0.19	VII.
P. III, 162.....	7	3	41	43	+3.27	80	44.4	—0.19	VII.

* Not in D. M. Greenwich place agrees with W. B.

NAME.	Mag.	R. A. 1875.0.	Annual variation in R. A.	N. P. D. 1875.0.	Annual variation in N. P. D.	Greenwich Catalogues.
		h. m. s.	s.	° ′	′	
P. III, 170	6.5	3 42 48	+3.60	64 47.9	−0.19	A, XII, VI, VII.
BR. 531	7	3 42 58	3.04	91 50.1	0.19	IX.
BR. 536	7	3 45 48	3.04	91 31.4	0.19	VII.
CARRINGTON, 550	10	3 45 53	11.00	8 0.2	0.19	IX.
P. III, 177	6.5	3 46 23	5.22	27 17.8	0.19	XII, VII, (VII), IX.
P. III, 178	6	3 46 30	5.06	29 15.5	0.19	XII, (VII) IX.
LL. 7115	9	3 46 50±	5.21	27 35.4	0.19	XII.
P. III, 186	6.5	3 46 58	4.29	42 29.9	0.18	(VII), IX.
W.B. III, 909	7.8	3 48 1	3.01	93 19.5	0.18	VII, (VII).
LAC. 1273	6	3 49 8	2.47	118 2.4	0.18	VII, (VII).
P. III, 160	5.6	3 49 14	9.70	9 39.1	0.18	XII, VI, (VII), IX.
BR. 544	7	3 50 38	2.79	103 57.7	0.18	XII, VI, VII, (VII).
XII, 337	....	3 51 2	5.88	22 1.2	0.18	XII, VI.
VII, 499	....	3 51 49	3.61	64 30.7	0.18	(VII).
CARRINGTON, 567	10	3 52 50	10.66	8 31.0	0.18	IX.
BR. 545 (1st star)	7	3 53 31	3.55	67 9.1	0.18	(VII).
BR. 545 (2d star)	7	3 53 32	3.55	67 9.2	0.18	(VII).
P. III, 215	6	3 53 37	3.45	72 9.6	0.17	A, XII, IX.
BR. 547	6	3 53 50	3.49	70 9.2	0.18	(VII), IX.
P. III, 208	6.5	3 54 3	4.95	31 11.6	0.18	XII.
LL. 7443	9.10	3 54 50	3.87	55 1.5	0.17	VII, (VII).
GR. 771	7.6	3 54 50±	6.86	16 46.4	0.17	IX.
LL. 7447	8	3 57 6	4.80	33 35.9	0.17	(VII).
P. III, 237	8.9	3 57 57	3.53	68 17.0	0.17	(VII), IX.
GR. 750	6	3 57 58	16.92	4 46.7	0.17	VII, (VII), IX.
VII, 289	....	3 58 48	4.13	47 28.7	0.17	VII.
VII, 291	....	3 59 16	4.14	47 16.5	0.17	VII.
GR. 766	6	3 59 26	+13.29	6 30.2	−0.17	XI.

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		h.	m.	s.	s.	°	′	′	
P. III, 249	6	4	0	50	+3.43	72	59.7	—0.17	A, XII, (VII)
Ruemker 1092..	7	4	1	22	3.57	66	27.6	0.17	VI.
Gr. 780	7	4	1	25	6.14	20	49.1	0.17	XII.
VI, 261	....	4	1	51	3.36	75	48±	0.17	VI.
P. III, 254.....	6.5	4	2	3	3.35	76	56.2	0.16	XII, VI, VII
XII, 352	....	4	2	40±	3.36	76	7.5	0.17	XII.
XII, 353	...	4	2	40±	3.36	75	47.1	0.17	XII.
Gr. 774	6	4	2	41	12.58	6	58.0	0.16	IX.
W. B. IV, 21...	9	4	3	23	3.22	82	37.9	0.16	VII.
VII, 296	....	4	3	46	2.92	97	15±	0.16	VII.
W. B. IV, 30 ...	9	4	3	58	3.36	76	3.6	0.16	VI, VII.
XII, 354	....	4	4	51	3.34	76	58±	0.16	XII.
Gr. 784	6	4	4	59	7.70	14	12.3	0.16	A, XII, VI, VII, IX.
W. B. IV, 53 ...	9	4	5	9	3.38	75	23.4	0.16	VI, VII.
VI, 267	....	4	5	10±	3.37	75	23.4	0.16	VI.
Gr. 779...	6	4	5	23	10.10	9	28.8	0.16	XII, VII, (VII), IX.
P. III, 260	6	4	5	53	5.23	28	28.0	0.16	IX.
XII, 356	....	4	6	3	3.34	76	55±	0.16	XII.
Br. 569	7.8	4	6	44	3.26	81	25.7	0 16	(VII.)
W. B. IV, 93....	7.8	4	6	52	3.33	77	33.9	0.16	XII, XI.
W. B. IV, 124..	9	4	8	16	3.13	86	57.1	0.15	VI.
P. IV, 10	6	4	8	56	5.59	25	10.0	0.16	VI, (VII), IX.
Gr. 804	6	4	9	29	4.13	48	10.1	0.16	VII, (VII), IX.
W. B. IV, 180 ..	8	4	10	47	3.12	87	46.9	0.15	VI.
P. IV, 22	6.5	4	10	56	5.18	29	33.8	0.15	IX.
P. IV, 31	6	4	11	37	4.12	48	29.7	0.16	(VII), IX.
B. F. 522.....	6	4	11	42	4 86	33	47.9	0.15	A, XII.
VI, 274	....	4	11	56	+3.44	72	46.6	—0.15	VI.

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		h. m. s.	s.	° ′	′	
LL. 8015	8	4 11 57	+4.27	44 50.8	—0.15	VII.
VII, 309	....	4 12 0	4.25	45 9.7	0.15	VII.
BR. 587.....	6.7	4 13 51	3.37	76 26.1	0.16	(VII.)
59 χ^1 Tauri...	....	4 14 59	3.64	64 40.1	0.15	VII, (VII), IX.
χ^2 Tauri.....	6.5	4 14 59	3.64	64 39.8	0.15	VII, (VII), IX.
61 δ^1 Tauri.....	4	4 15 44	3.45	72 45.0	0.15	VI.
BR. 592.....	8	4 15 58	3.62	65 53.1	0.15	A, XII.
62 Tauri (1st star)	....	6 16 26	3.61	65 69.4	0.15	(VII), IX.
62 Tauri (2nd star)	6	4 16 28	3.61	65 59.5	0.15	(VII).
61 δ^2 Tauri.....	6	4 16 54	3.45	72 50.7	0.14	VI.
W. B. (2) IV, 353	9	4 17 39	3.51	70 14.0	0.14	IX.
GR. 829.....	8	4 17 50±	5.76	24 8.4	0.14	IX.
P. IV, 69.....	6	4 18 9	3.80	58 50.5	0.15	A, XII.
GR. 828.....	6	4 19 3	6.86	17 44.5	0.15	A, XII, VI.
LL. 8336.....	9	4 19 43	3.48	71 9.6	0.15	VI, VII, (VII).
P. IV, 82.....	6	4 20 36	3.56	68 39.7	0.14	IX.
1 Camelopardalis (1st star)	 6	4 22 10±	4.71	36 21.7	0.14	XII.
1 Camelopardalis (2d star)	....	4 22 8	4.72	36 21.8	0.14	XII.
VII, 321.....	Var	4 22 21	3.28	80 19.9	0.14	VII.
BR. 619.....	5	4 23 25	3.43	74 4.8	0.14	A, XII, VI, IX.
P. IV, 102.....	7	4 23 38	3.42	74 7.4	0.14	A, XII, VI.
BR. 616....	6.7	4 24 34	4.20	47 14.1	0.14	(VII).
W. B. (2) IV, 523	9	4 25 39	3.74	61 20.2	0.13	IX.
XII, 384	....	4 26 20±	3.41	74 18.2	0.13	XII.
BR. 625	7	4 26 29	3.43	73 56.6	0.13	(VII).
XII, 385	...	4 26 30±	3.41	74 18.4	0.13	XII.
P. IV, 111.....	6	4 26 49	3.75	61 18.1	0.13	VI, IX.
LL. 8553	9	4 27 2	+4.39	42 54.4	—0.13	XII, VI.

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		h. m. s.	s.	° ′	′	
LL. 8555	8.5	4 27 3	+4.39	42 53.4	−0.13	XII, VI.
XII, 390	....	4 27 37	2.89	98 31.2	0.13	XII, VI.
BR. 633	6	4 28 9	2.92	97 6.0	0.13	(VII.)
VI, 297	....	4 28 26	3.83	58 6.2	0.13	VI.
XII, 394	....	4 28 32	3.41	74 25±	0.13	XII.
(VII), 575	....	4 29 15	2.84	120 50.1	0.12	(VII.)
VI, 300	....	4 29 40±	3.41	74 23.2	0.13	VI.
Br. 635	7	4 29 48	2.98	93 52.2	0.13	(VII.)
P. IV, 151	6	4 32 0	2.82	120 58.3	0.12	VII, (VII), IX.
P. IV, 112	6	4 32 3	7.98	14 17.4	0.12	VI, (VII), IX.
VII, 333	....	4 33 23	3.54	69 18±	0.13	VII.
P. IV, 148	6.5	4 33 31	3.75	61 37.7	0.12	A, XII, IX.
BR. 650	6	4 33 35	2.76	104 36.2	0.12	VI, VII.
LL. 8798	9	4 33 58	3.54	69 20.1	0.12	VII, (VII).
P. IV, 158	8	4 34 42	3.59	67 18.1	0.12	A, XII, VI.
VII, 337	....	4 35 15	3.58	67 38.2	0.12	VII.
LL. 8845	8	4 35 24	3.28	80 36.3	0.12	VII.
VII, 339	....	4 36 25	3.60	66 53.0	0.12	VII.
GR. 856	6	4 37 2	10.96	9 1.1	0.12	XII, VI, IX.
P. IV, 169	6	4 37 31	3.33	79 5.3	0.12	VI, VII.
55 Eridani.... (1st star.)	6	4 37 35	2.88	99 1.8	0.12	(VII.)
55 Eridani.... (2d star.)		4 37 36	2.89	99 1.9	0.12	(VII.)
BR. 654	7.8	4 38 10	3.62	66 36.2	0.12	(VII.)
GR. 870	6	4 38 17	6.16	22 3.3	0.12	IX.
RUEMKER, 1268.	8.9	4 38 42	3.42	74 18.0	0.12	VI.
P. IV, 179	6	4 38 59	3.49	71 29.6	0.11	(VII), IX.
LAC. 1569	6	4 39 13	2.40	117 48.5	0.13	VII, (VII.)
P.IV, 190.....	7.8	4 41 23	+3.51	71 30.0	−0.11	VII, (VII.)

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VII, 345.... ...	....	4 41 34	+3.57	68 25.8	—0.11	VII, (VII).
VII, 346.....	....	4 42 7	3.57	68 18.2	0.11	VII, (VII).
LL. 9028	8	4 42 18	3.57	68 16.3	0.11	(VII).
P. IV, 194.....	7.8	4 42 19	3.42	74 19.9	0.11	A, XII, VI.
BR. 661	7	4 43 58	4.02	53 34.3	0.11	(VII).
VII, 349.....	....	4 44 32	3.58	68 5.4	0.11	VII.
(VII), 613	9	4 44 53	3.58	68 6.7	0.11	(VII).
(VII), 614.....	9	4 45 1	3.58	68 8.7	0.11	(VII).
LL. {9136, 9137, 9139}	7	4 46 2	3.61	66 53.5	0.11	A, XII.
P. IV, 191	6	4 46 30	7.49	15 56.3	0.11	IX.
LL. (F.) 693....	6	4 47 44	20.32	4 12.6	0.11	(VII).
P. IV, 236.....	6	4 48 2	3.24	82 25.5	0.10	IX.
B. F. 625	6	4 48 39	3.65	65 37.2	0.10	IX.
P. IV, 204.....	6	4 48 40	7.38	16 26.2	0.10	IX.
W. B. IV, 1048..	9	4 49 7	3.38	76 13.5	0.10	VI.
BR. 686.....	6	4 50 9	3.46	73 2.7	0.10	VII, IX.
BR. 671.....	6.7	4 50 11	6.04	23 21.3	0.10	(VII), IX.
W. B. IV, 1077.	9	4 50 12	3.20	84 10.1	0.10	VII, (VII).
LL. 9327.....	6	4 50 23	2.45	115 55.8	0.10	VII, (VII).
W. B. IV, 1086.	9	4 50 45	3.38	76 11.6	0.10	VI.
W. B. IV, 1081.	9	4 50 48	3.38	76 15.8	0.10	VI.
W. B. IV, 1096.	9	4 51 15	3.38	76 14.3	0.10	VI.
LL. 9354.....	6	4 52 1	2.74	104 25.6	0.10	VII, (VII).
(VII), 631	Var	4 52 13	3.25	82 3.6	0.10	(VII).
LL. 9362.....	7.8	4 52 49	3.56	69 15.8	0.09	VII.
XII, 416	...	4 55 4	3.75	62 8.3	0.10	XII.
W. B. IV, 1199.	8	4 55 17	+3.38	76 16.0	—0.10	VI.

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		h.	m.	s.	s.	°	′	′	
W. B. IV, 1218..	9	4	56	4	+3.38	76	27.0	−0.09	VI.
P. IV, 254.....	5.6	4	56	38	7.47	16	13.1	0.09	XII, IX.
XII, 418	....	4	56	52	3.77	61	25.9	0.09	XII.
P. IV, 287	7	4	58	9	3.70	63	44.6	0.09	VI.
W. B. IV, 1312.	8	4	59	39	3.39	76	4.7	0.09	VI.
VII, 374.	....	5	0	58	3.27	81	26.1	0.09	VII.
(VII), 650.....	9	5	1	7	3.27	81	23.0	0.09	(VII.)
VII, 375.....	....	5	1	20	3.27	81	26.1	0.09	VII.
(VII), 652.... ..	9	5	1	29	3.27	81	21.8	0.09	(VII.)
P. IV, 269.....	5	5	2	0	9.72	10	55.2	0.09	VI, VII, (VII), IX.
XII, 424	....	5	2	0±	3.39	76	11.9	0.09	XII.
LL. 9671	8½	5	2	13	3.39	76	14.5	0.09	XII, VI.
BR. 718	7	5	2	21	2.88	98	49.8	0.08	VI.
GR. 928	6	5	2	49	7.84	16	52.8	0.08	IX.
W. B. V. 11....	9	5	3	10	3.39	76	9.9	0.08	VI.
W. B. V. 12....	9	5	3	11	3.39	76	10.4	0.08	VI.
XII, 427.....	....	5	3	41	3.81	60	15.3	0.08	XII.
VI, 350.....	....	5	4	38	3.71	63	41.7	0.08	VI.
W. B. V. 48....	9	5	4	58	3.40	75	47.5	0.08	VI.
W. B. V. 54....	9	5	5	17	3.39	76	13.7	0.08	VI, VII.
GR. 931.....	6	5	6	31	9.34	11	43.1	0.08	IX.
BR. 724.....	7	5	6	38	2.80	102	0.4	0.08	(VII.)
14 Aurigae ..... (1st star.)	....	5	7	20±	3.90	57	27.7	0.08	XII.
14 Aurigae ..... (2d star.)	5.6	5	7	16	3.90	57	27.5	0.08	XII.
BR. 729.....	7	5	7	32	2.88	98	17.7	0.08	A, XII, VI.
A, 267	....	5	8	32	2.88	98	20.9	0.08	A, XII, VI, VII, (VII), IX.
P. IV, 311.....	6	5	9	14	+9.31	11	49.3	−0.08	IX.

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P. IV, 317	6.7	5	10	12	+9.14	12	8.6	−0.07	(VII), IX.
VII, 385	....	5	11	25	3.11	88	24.2	0.07	VII.
VI, 360	....	5	11	38	3.11	38	25±	0.07	VI.
VI, 358	...	5	11	49	3.67	65	29.1	0.07	VI.
Br. 743	6.7	5	11	56	2.75	103	39.3	0.07	IX.
VI, 361	....	5	12	2	3.71	63	52.4	0.07	VI, VII, (VII).
XII, 438	....	5	12	6	3.16	86	9.3	0.07	XII.
XII, 439	....	5	13	3	3.16	86	8±	0.07	XII.
P. V, 41	6.7	5	13	9	3.76	62	10.3	0.07	VI, VII, IX
W. V, 271	9	5	13	30±	3.16	86	4.5	0.07	XII.
W. V, 294	9	5	14	27	3.17	85	38.9	0.07	XII.
W. V, 303	7.8	5	14	44	3.16	86	6.8	0.07	XII.
B. F. 698 / Br. 750	6	5	15	9	3.06	90	32.4	0.07	A, XII, VI.
P. V, 61	8	5	15	31	3.14	86	33.1	0.07	XII, VI, VII (VII).
Ll. 10089	....	5	16	17	3.15	86	34.2	0.07	(VII).
W. B. V, 343	7.8	5	16	20±	3.15	86	34.0	0.07	XII, VI.
Ll. 10056	8	5	16	21	3.68	65	9.4	0.07	VI.
P. V, 63	6	5	16	35	3.86	58	58.4	0.07	A, XII.
P. V, 70	5.6	5	16	39	2.46	114	53.9	0.06	A, XII.
Ll. 10096	9	5	17	3	3.48	72	44.1	0.06	VI, VII, (VII).
Br. 757	6.7	5	17	30	3.04	90	59.1	0.06	(VII).
Br. 755	6	5	18	32	3.98	55	48.2	0.06	(VII), IX.
VI, 376	...	5	19	21	3.73	68	31.6	0.06	VI.
A, 276	....	5	19	24	3.59	68	19.8	0.06	A, XII.
Br. 772	7.8	5	19	59	3.13	87	10.5	0.06	(VII).
Br. 769	8	5	20	19	3.45	74	4.1	0.06	(VII), IX.
Br. 774	7	5	20	57	+3.46	73	39.9	−0.06	(VII).

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118 Tauri..... (1st star.)	6	5 21 34	+3.69	64 57.2	—0.06	VI.
118 Tauri... ... (As one mass.)	6	5 21 35	3.69	64 57.1	0.06	VI, VII, (VII).
118 Tauri..... (2nd star.)	6	5 21 35	3.69	64 57.1	0.06	VI.
VII, 401.....	....	5 21 49	7.98	15 2.1	0.06	VII.
GR. 944.....	6	5 22 7	18.34	4 52.4	0.06	XII, VI, VII (VII), IX.
LAC. 1849	6	5 22 24	2.42	116 41.4	0.05	VII, (VII).
GR. 966	5	5 23 1	8.02	15 2.6	0.05	A, XII, VI, (VII), IX.
VI, 383	....	5 23 16	3.73	63 30.9	0.05	VI, VII.
BR. 778.....	7.8	5 23 20	3.05	90 54.1	0.05	(VII.)
W. B. V, 603...	8	5 25 37	3.06	90 22.7	0.05	A, XII, VI.
GR. 987.....	6	5 26 50	4.52	42 22.2	0.05	XII.
VI, 390.....	....	5 27 4	3.73	63 24.8	0.05	VI, VII.
LL. 10430.....	8	5 27 10	3.74	63 6.6	0.05	VII, (VII).
LL. 10456... ...	6.7	5 27 11	3.04	91 14.8	0.05	XII, VII.
VI, 391.....	....	5 27 17	3.73	63 28±	0.05	VI.
P. V, 136.....	6.7	5 28 5	3.76	62 25.2	0.05	IX.
W. B. V, 658...	7	5 28 5	3.07	90 5.8	0.05	VI.
39 λ^1 Orionis. (1st star.)	3.4	5 28 15	3.30	80 9.0	0.05	VII, (VII).
39 λ^2 Orionis. (2nd star.)		5 28 16	3.30	80 8.9	0.05	VII, (VII).
LL. 10527.....	8	5 28 54	2.93	96 5.6	0.05	(VII.)
BR. 801.....	7	5 28 56	2.92	96 5.1	0.05	(VII.)
B. F. 759	6	5 29 3	2.31	119 56.0	0.05	A, XII.
VII, 418.....	9	5 29 4	2.93	96 0.6	0.05	VII, (VII.)
44 ι^1 Orionis....	3	5 29 19	2.93	95 59.5	0.05	VI, VII.
ι^2 Orionis.....	....	5 29 20	2.93	95 59.7	0.05	VI, VII.
P. V, 145.....	7	5 29 21	3.75	63 9.3	0.05	VI, VII.
RADCLIFFE 1516.	6	5 29 55	6.00	24 22.5	0.04	VII, (VII), IX.
VI, 401.....	....	5 31 10	+3.73	63 27.5	—0.04	VI.

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P. V, 146.....	6.7	5 31 12	+4.86	36 34.4	−0.03	(VII), IX.
B. F. 747.....	6.7	5 31 21	3.81	60 51.6	0.04	IX.
Arg. zone+16°. No. 835.	8	5 33 4	3.46	73 40.3	0.04	IX.
LL. 10705.....	8	5 33 38	3.03	91 59.8	0.04	(VII), IX.
LL. 10669.....	9	5 33 50	3.73	63 27.1	0.04	VI.
50 9^1 Orionis...	2	5 34 27	3.03	92 0.6	0.04	VII, (VII).
9^2 Orionis.....	5.6	5 34 27	3.02	92 0.7	0.04	VII, (VII).
P. V, 184.....	7	5 34 31	3.62	67 24.8	0.04	IX.
BR. 818.....	8	5 35 7	3.53	71 4.6	0.04	(VII).
BR. 823.....	7	5 35 52	3.40	75 52.9	0.04	A, XII.
XII, 484.....	....	5 37 12	3.25	82 19±	0.04	XII.
BR. 824.....	7.8	5 37 23	3.44	74 59.7	0.03	(VII).
XII, 485.....	....	5 38 36	3.25	82 17.1	0.03	XII.
γ^1 Leporis.....	....	5 39 14	2.51	112 27.8	0.03	XII, VI, VII (VII).
13 γ^2 Leporis...	4	5 39 15	2.50	112 29.5	0.02	VII.
LL. 10769.....	6	5 39 29	6.44	21 34.2	0.03	VII, (VII), IX.
XII, 490.....	....	5 40 0±	3.25	82 15.2	0.03	XII.
W. V, 991.....	8.9	5 40 17	3.25	82 27.9	0.03	XII.
W. B. V, 1015...	8	5 41 8	3.26	82 5.1	0.03	XII, VI.
XII, 494.....	....	5 41 40±	3.25	82 29.5	0.03	XII.
W. V, 1025.....	8.9	5 41 45	3.25	82 9.7	0.03	XII.
P. V, 239.....	6	5 43 10	3.31	80 10.3	0.02	VII.
BR. 846.....	7	5 43 42	3.42	75 35.8	0.02	(VII).
BR. 847.....	7	5 43 46	3.41	75 59.2	0.03	A, XII.
VII, 438.....	....	5 44 4	5.18	32 17.4	0.03	VII.
P. V, 243.....	6	5 44 24	3.97	56 7.1	0.02	(VII), IX.
LL. 11095.....	8	5 45 48	3.69	64 57.5	0.02	XII, VI.
BR. 850.....	7½	5 45 54	+3.57	69 44.0	−0.03	XII, VI, (VII).

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LL. 11108.....	8½	5	46	12	+3.73	63	36.5	—0.02	VI.
P. V, 256.....	6.7	5	46	52	3.89	58	19.2	0.02	A, XII, IX.
P. V, 248.....	7	5	47	13	5.03	34	21.9	0.02	IX.
P. V, 246.....	6	5	47	51	6.19	23	0.1	0.02	VII, (VII), IX.
VI, 426.....	....	5	47	52	3.74	63	32.7	0.02	VI.
XII, 511.....	....	5	49	0±	4.05	53	46.8	0.02	XII.
XII, 512.....	....	5	49	0±	4.09	52	46.4	0.02	XII.
VI, 429.....	....	5	49	4	4.22	49	13.2	0.02	VI.
LL. {11198 / 11199}	7.5	5	49	17	3.67	65	46.2	0.02	A, XII.
BR. 851	6.7	5	49	21	5.00	34	41.6	0.01	(VII), IX.
VI, 430.....	....	5	49	31	4.22	49	13.8	0.02	VI.
XII, 513..	....	5	49	37	4.08	52	46.3	0.02	XII, VI.
P. V, 282.....	8	5	51	44	3.12	88	9.6	0.01	VII.
B. F. 817	6	5	51	51	3.38	77	12.4	0.01	IX.
W. B. V, 1317..	8	5	52	39	2.82	100	51.2	0.01	IX.
BR. 865.....	6.7	5	53	51	4.34	46	37.6	0.01	(VII), IX.
XII, 518.....	....	5	54	2	5.33	30	36.4	0.01	XII.
RUEMKER 1673..	....	5	55	41	3.73	63	43.2	0.01	VI.
RUEMKER 1680..	8	5	56	6	3.73	63	38.7	0.01	VI.
P. V, 306.....	7	5	56	29	3.72	64	33.1	0.01	VI.
GR. 1004.....	6	5	56	58	27.00	3	14.2	0.01	XII, VI, VII (VII).
LL. 11509	8½	5	58	25	3.65	66	28.8	0.00	XII, VI.
RUEMKER 1701..	....	5	58	48	3.73	63	39.8	0.00	VI.
RUEMKER 1705..	....	5	59	15	3.74	63	19.2	0.00	VI.
RUEMKER 1707..	....	5	59	32	3.74	63	18.5	0.00	VI.
BR. 889.....	6	5	59	38	+2.83	100	14.2	—0.00	(VII), IX.

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VII, 456.....	....	5	59	41	+3.73	63	57.7	−0.00	VII.
W. B. V, 1531...	9	6	0	20	2.82	100	52.5	0.00	IX.
VII, 458.....	....	6	0	43	3.72	64	1.1	0.00	VII.
VI, 448.....	....	6	0	47	3.64	66	54.9	0.00	VI.
VII, 460.....	....	6	0	55	3.73	63	54.9	0.00	VII.
Br. 894.....	7	6	1	1	2.81	101	9.7	0.00	IX.
XII, 528...	....	6	1	13	3.64	66	52±	0.00	XII.
VII, 461.....	....	6	1	20	3.64	66	53.2	0.00	VII.
VI, 449.....	...	6	1	28	3.65	66	47.5	0.00	VI.
41 Aurigae... (1st star).	6	6	2	2	4.61	41	16.2	+0.04	(VII.)
41 Aurigae... (2nd star).		6	2	2	4.61	41	16.3	+0.04	(VII.)
Ll. 11684	8	6	3	7	3.73	63	57.8	0.00	VI. VII, (VII.)
VII, 464... ...	....	6	3	8	3.60	68	28.2	0.00	VII.
Ll. 11714	9	6	3	59	3.72	63	59.3	0.00	VI.
P. V. 335... ...	5.4	6	5	4	6.62	20	38.4	+0.01	A, XII, VII (VII), IX.
P. V. 337.....	6	6	5	44	6.66	20	23.4	0.01	IX.
W. B. (2) VI, 132-3	8.9	6	7	13	4.05	53	49.1	0.01	(VII), IX.
Br. 904..... ...	6.7	6	7	14	4.05	53	49.0	0.01	(VII), IX.
Ll. 11854	8	6	7	42	3.71	64	37.8	0.01	VI.
Br. 912.....	6.7	6	9	11	4.00	54	48.6	0.01	(VII), IX.
Ll. 11946	9½	6	9	12	3.71	64	27.8	0.01	VI.
P. VI, 43.....	7	6	10	31	3.76	62	44.4	0.01	A, XII.
Br. 918.....	6.7	6	10	32	4.01	54	44.8	0.02	(VII), IX.
A, 324.....	....	6	11	0±	3.75	62	57.9	0.01	A, XII.
Ll. {11976 11978} ..	9	6	11	3	3.71	64	25.2	0.01	VI.
A, 323.....	...	6	11	5	3.64	66	56.6	0.01	A, XII.
A, 325.....	....	6	11	25	3.64	66	57.0	0.01	A, XII, VI.
VI, 461.....	....	6	11	28	+3.72	63	57.9	+0.01	VI.

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A, 327	....	6	11	35	+3.64	66	59.0	+0.01	A, XII.
LL. 11996	9	6	11	43	3.72	64	16.0	0.01	VI.
A, 328	...	6	11	50±	3.76	62	33.8	0.01	A, XII.
A, 329	....	6	12	10±	3.76	62	39.8	0.01	A, XII.
RUEMKER 1809	....	6	12	13	3.86	59	34.8	0.02	VI.
W. B VI, 334	9	6	12	31	2.73	104	17.2	0.02	VI, VII, (VII.)
LL. { 12041 / 12042 }	8	6	12	51	3.71	64	20.4	0.02	VI.
W. B. VI, 348	8	6	12	54	2.73	104	18.7	0.02	VII, (VII.)
VI, 467	....	6	13	9	3.72	64	14.8	0.02	VI.
LL. 12070	7½	6	14	4	3.84	59	58.9	0.02	A, XII.
P. VI., 54	6.7	6	14	20±	5.66	27	15.0	0.02	IX.
P. VI. 78	7	6	17	1	3.70	64	53.3	0.03	VI, VII, IX.
BR 983	8	6	17	9	3.19	85	20.4	0.02	(VII)
LL. 12237	9	6	18	23	3.71	64	25.4	0.03	VI, VII.
LL. 12240	8	6	18	29	3.71	64	20.0	0.03	VI, VII.
VII, 483	....	6	18	30±	3.71	64	22.2	0.03	VII.
BR. 987	8	6	20	11	3.98	55	26.0	0.03	(VII).
15 Geminorum (1st star.)	8	6	20	18	3.58	69	8.6	0.03	A, XII, VI, IX.
15 Geminorum (2d star.)	6	6	20	20	3.58	69	8.1	0.03	A, XII, VI.
A, 340	....	6	20	55	3.58	69	7.1	0.03	A, XII.
LL. 12336	8½	6	21	0	3.71	64	18.2	0.03	VI.
W. VI, 606	7	6	21	2	2.73	104	31.9	0.03	XII.
GR. 1151	6	6	21	2	9.39	11	54.6	0.03	A, XII, VI, VII, IX.
LL. 12339	7	6	21	7	3.75	62	57.3	0.03	A, XII.
VI, 480	....	6	21	16	3.70	64	48.3	0.03	VI.
VI, 481	....	6	21	29	3.70	64	52.3	0.03	VI.
A, 343	....	6	21	45	+3.58	69	6.6	+0.03	A, XII.

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LL. 12360	9½	6	21	59	+3.93	57	7.8	+0.03	A, XII, VI.
A, 345	....	6	22	0±	3.75	62	58.2	0.03	A, XII.
RADCLIFFE 1742	6	6	22	7	7.65	16	12.8	0.03	VI, IX.
A, 347.....	8	6	22	27	3.93	57	7.3	0.03	A, XII, VI.
P. VI, 114.....	6.7	6	22	29	3.79	61	42.4	0.03	IX.
VI, 485.....	....	6	22	39	3.70	64	46.3	0.03	VI.
LL. 12395.....	9	6	22	47	3.72	64	14.3	0.04	VI, VII.
A, 348	..	6	22	49	3.93	57	4.9	0.03	A, XII, VI.
B. F, 907... ...	7½	6	22	50±	3.63	67	22.4	0.03	A, XII.
VI, 488.....	....	6	23	13	3.71	64	29.5	0.03	VI.
P. VI, 136.....	4.5	6	23	32	2.23	122	30.1	0.03	VII, (VII), IX.
A, 349.....	...	6	24	17	3.93	57	5.4	0.03	A, XII.
P. VI, 126.....	6	6	24	18	3.93	57	27.4	0.03	A, XII, (VII) IX.
LL. 12478	8.9	6	24	40	3.55	70	11.7	0.04	VII, (VII).
P. VI, 75.....	5.6	6	24	53	10.43	10	18.3	0.04	VII, (VII), IX.
GR. 1178.....	7	6	25	23	5.22	31	47.5	0.04	(VII), IX.
LL .... {12489 12490}	7	6	25	31	3.94	56	53.1	0.03	A, XII, VI.
W. B. VI, 732..	8	6	25	31	3.19	85	5.4	0.04	VII, (VII).
LL. 12510.....	8	6	25	49	3.78	61	55.9	0.04	A, XII.
A, 355..... ...	....	6	25	47	3.94	56	53±	0.04	A, XII.
CARRINGTON 929	8.7	6	26	45	17.64	5	12.2	0.04	IX.
LL. 12554.....	8	6	27	20	3.69	64	59.1	0.04	VI.
LL. 12557.....	9	6	27	22	3.68	65	16.3	0.04	VI.
VII, 497.....	....	6	27	34	3.41	75	45.1	0.04	VII.
GR. 1190	6.7	6	27	57	4.13	51	27.3	0.04	(VII), IX.
P. VI, 164.....	5.6	6	27	59	2.27	121	56.3	0.04	VII, (VII).
P. VI, 157.....	7.8	6	28	39	+3.47	73	27.3	+0.04	VI.

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VI, 492	....	6 28 43	+4.00	55 7.7	+0.04	VI.
VI, 495	....	6 28 57	3.68	65 28.2	0.04	VI.
RUEMKER 1926	7	6 29 2	3.99	55 22.4	0.04	A, XII, VI, VII, (VII).
VI, 496	....	6 29 28	3.68	65 30.0	0.04	VI.
A, 358	....	6 29 38	3.99	55 24.4	0.04	A, XII, VII, (VII).
P. VI, 165	6.7	6 29 48	3.69	65 18.4	0.04	VI, IX.
A, 357	....	6 29 50±	3.99	55 22.4	0.04	A, XII.
P. VI, 168	7.8	6 30 39	3.68	65 26.5	0.04	VII, (VII).
ν^2 Canis Maj. (1st star)	8	6 30 53	2.63	108 33.5	0.04	VII, (VII), IX.
6 ν^1 Canis Maj. (2d star)	6.7	6 30 54	2.62	108 33.5	0.04	VII.
RUEMKER 1942	....	6 31 16	3.98	55 27.3	0.04	A, XII, VI, VII.
LL. 12712	7	6 31 34	3.61	67 51.5	0.04	A, XII.
P. VI, 203	6	6 34 40	3.09	89 23.3	0.05	VI, VII,
LL. 12828	7	6 35 40	4.38	45 32 4	0.05	(XII), VI.
XII, 586	....	6 36 38	4.68	39 29.5	0.05	XII.
OE. A. 7190	8.9	6 36 40	4.62	40 30.0	0.05	VI.
LL. 12939	9	6 37 45	3.77	62 12.1	0.05	VII, (VII).
A, 366	....	6 39 28	3.75	62 44.6	0.06	A, XII.
A, 368	....	6 41 0±	3.75	62 40.3	0.06	A, XII.
P. VI, 201	5.4	6 41 48	8.85	12 52.2	0.06	VI, IX.
XII, 595	....	6 41 52	3.75	62 40±	0.06	XII.
A, 369	....	6 42 10	3.99	54 59.0	0.06	A, XII, VI.
A, 370	....	6 42 58	4.10	51 56±	0.06	A, XII.
A, 371	....	6 43 15	4.10	51 56±	0.06	A, XII,
XII, 599	....	6 43 30	4.62	40 24±	0.06	XII.
A, 372	....	6 43 54	3.99	55 2±	0.06	A, XII.
LL. {13136 12137}	8½	6 44 1	+3.96	+56 3.6	+0.06	XII, VI.

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		h. m. s.	s.	° ′	′	
XII, 605	....	6 44 33	+3.96	55 53±	+0.06	XII.
A, 373	....	6 44 36	4.10	51 56±	0.06	A, XII.
XII, 607	....	6 45 6	2.73	104 35.7	0.05	XII.
Lac. 2470	6	6 45 6	2.42	117 11.4	0.06	VII.
Ll. 13153	7½	6 45 15	4.58	40 56.5	0.06	XII, VI.
VII, 524	6	6 45 41	3.56	69 34.8	0.06	VII.
Gr. 1328	6.7	6 47 8	6.87	19 1.7	0.07	VII, (VII.) IX.
P. VI, 278	6	6 48 35	2.40	118 23.3	0.08	VII, (VII).
Ll. 13463	6	6 50 32	2.52	112 46.9	0.07	IX.
Arg. Zone + 26° No. 1410.	8.9	6 51 31	3.71	63 55.3	0.06	IX.
Gr. 1245	6	6 51 42	6.84	19 5.5	0.07	IX.
P. VI, 294	7	6 52 40	3.46	73 53.4	0.08	VI, VII.
A. 378	....	6 52 40±	2.44	115 44.7	0.07	A, XII.
B. F. 984	6	6 54 4	3.32	79 12.0	0.08	IX.
A, 377	....	6 54 20±	3.71	63 58.8	0.08	A, XII.
XII, 615	....	6 54 41	3.71	63 57±	0.08	XII, VI.
P. VI, 293	6	6 54 57	5.33	30 0.9	0.08	IX.
A, 380	....	6 54 58	4.09	51 56.1	0.08	A, XII.
Gr. 1261	7.8	6 55 16	4.19	49 14.4	0.08	XII.
P. VI, 305	6.5	6 55 34	3.82	60 26.9	0.08	A, XII.
P. VI, 301 (1st star).	6	6 55 44	4.80	37 3.4	0.08	XII, VI.
P. VI, 301 (As one mass.)	6	6 55 44	4.80	37 3.5	0.08	XII, VI.
P. VI, 301 (2d star).	6	6 55 44	4.80	37 3.5	0.08	XII, VI.
Lac. 2570	6½	6 55 58	2.47	115 2.4	0.08	XII. VI.
Lac. 2572	7	6 56 6	2.45	115 46.4	0.08	A, XII.
P. VI, 313	6	6 56 28	3.30	80 40.9	0.08	VII.
P. VI, 311	8	6 56 41	3.56	69 13.4	0.08	A. XII. VI. VII, (VII).
eminorum	8	6 56 41	3.56	69 13.4	+0.08	VII.

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		h.	m.	s.	s.	°	′	′	
43 ζ² Geminorum	4	6	56	42	+3.56	69	14.9	+0.08	VII.
P. VI, 316.....	5.6	6	57	57	3.95	55	20.3	0.09	IX.
Ll. 13739.....	Var.	6	59	50	3.62	67	6.4	0.09	VII, (VII).
Ll. 13747.....	9	7	0	41	4.11	51	11.7	0.09	XII.
Carrington 1005	8.7	7	1	15	24.94	3	22.5	0.09	IX.
P. VI, 330.....	7	7	1	22	3.85	59	39.4	0.09	VII, (VII).
P. VI, 285.....	6.7	7	1	33	11.58	8	31.4	0.09	VII,)(VII), IX.
Arg. Zone +69°. No. 413.....	7.8	7	1	34	6.43	20	59.5	0.09	IX.
VI, 536.....	....	7	1	43	4.09	51	40.4	0.09	VI.
W. B. VI, 1911..	Var.	7	1	50	3.30	79	46.9	0.09	VII, (VII).
Ll. 13792.....	7½	7	1	55	3.70	64	4.1	0.09	XII, VI.
Ll. 13797.....	8	7	2	3	3.70	64	4.1	0.09	A, XII VI.
Ll. 13798.....	8½	7	2	7	3.70	64	9.6	0.09	A, XII.
XII, 634.....	....	7	2	22	3.70	64	9±	0.09	XII.
XII, 635.....	....	7	2	42	4.13	50	42.9	0.09	XII.
XII, 636.....	....	7	2	50±	3.70	64	7.3	0.09	A, XII.
VI, 540.....	....	7	3	18	3.53	70	29.4	0.09	VI.
VI, 541.....	....	7	3	20	3.53	70	28.3	0.09	VI.
Gr. 1272.....	5½	7	3	37	4.70	38	22.0	0.09	XII.
Br. 1036.....	7	7	4	9	3.44	74	27.8	0.09	(VII).
A, 394.....	....	7	4	18	3.53	70	29.3	0.09	A, XII.
XII, 644.....	....	7	4	20±	3.53	70	28.2	0.09	XII.
VI, 544.....	....	7	4	33	3.53	70	28±	0.09	VI.
W. VII, 93.....	8	7	4	39	2.74	104	33.8	0.09	XII.
P. VI, 292.....	5	7	4	39	13.02	7	21.3	0.09	A, XII, VI, VII(VII)IX
P. VII, 11.....	7	7	5	41	3.44	74	36.8	0.09	VII.
Gr. 1281.....	6	7	6	33	4.47	42	32.4	0.09	(VII.)
Br. 1048.....	7.8	7	6	49	+3.65	65	4.7	+0.10	(VII), IX.

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		h. m. s.	s.	° ′	′	
A, 396.....	....	7 7 10±	+3.70	63 46.8	+0.09	A, XII.
XII, 649.... ...	....	7 7 22	3.70	63 47±	0.09	XII.
XII, 650.....	....	7 7 26	3.70	63 47±	0.09	XII.
Ll. 14047	8	7 8 59	4.19	48 50.2	0.10	A, XII, VI.
Br. 1061	6.7	7 9 48	2.44	116 49.2	0.10	(VII), IX.
XII, 656.... ...	7	7 10 47	4.37	44 38±	0.10	XII.
A, 402.....	....	7 11 0±	3.70	63 50.9	0.10	A, XII.
W. B. VII, 302.	9	7 11 19	3.34	78 21.1	0.10	VI.
Br. 1035.....	8.9	7 11 29	7.30	16 40.9	0.10	A, XII, VII, (VII.)
W. B. VII, 306.	9	7 11 30	3.34	78 15.4	0.10	VI.
Ll. (F.) 1058....	9	7 11 37	7.30	16 40.9	0.10	A, XII, VII, (VII.)
P. VI, 334.....	6	7 11 48	11.14	8 51.4	0.10	A, XII, VI, IX.
Ll. 14177	8	7 11 56	3.59	67 44.9	0.10	VI, VII.
Gr. 1295.....	7	7 12 15	4.37	44 32.5	0.10	A, XII.
Br. 1054.....	7.8	7 12 38	4.92	34 29.0	0.10	(VII), IX.
VII, 565	....	7 12 39	3.59	67 47.4	0.10	VII.
Lac. 2729.....	6	7 13 43	2.29	120 34.3	0.10	(VII.)
W. B. (2) VII, 385	8	7 14 29	4.17	49 3.9	0.11	IX.
Gr. 1299.....	6	7 15 2	6.00	23 25.5	0.11	(VII), IX.
P. VII, 67.....	6	7 17 51	6.30	21 16.9	0.11	XII, VI, VII (VII), IX.
Lac. 2771.....	6.7	7 18 48	2.33	120 12.5	0.11	VII, (VII).
A, 409.....	...	7 19 0±	4.50	41 32.7	0.11	A, XII.
XII, 666.....	....	7 19 0±	4.49	41 41.9	0.11	XII.
A, 408.....	....	7 19 1	4.49	41 41.4	0.11	A, XII.
Oe. A. 7903	9	7 19 1	4.50	41 36±	0.11	VI.
Ll. 14381.....	8	7 19 3	4.49	41 41.4	0.11	A, XII, VI.
Gr. 1316.....	7	7 19 27	4.48	41 49.5	0.11	A, XII.
P. VII, 92.....	6	7 19 33	+4.50	41 33.8	+0.11	A, XII.

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LL. 14458.....	8½	7 20 58	+3.86	57 45.6	+0.11	A, XII, VI.
IX, 731.....	....	7 21 47	3.56	68 50.1	0.12	IX.
LL. 14512.....	8	7 21 47	3.56	68 48.5	0.12	IX.
LL. 14524.....	8	7 21 50	3.27	81 14.4	0.12	(VII.)
P. VII, 114	6	7 22 53	3.74	61 49.9	0.11	IX.
LL. 14593.....	8	7 25 19	4.48	41 32.5	0.12	A, XII.
VII, 576.....	....	7 25 34	3.26	81 28.6	0.12	VII, (VII).
VII, 577.....	Var	7 25 56	3.26	81 25.0	0.12	VII, (VII).
66 α^1 Geminor'm	2.1	7 26 37	3.84	57 50.4	0.12	A, XII, VI VII, (VII) IX.
66 α Geminor'm	2.1	7 26 40±	3.84	57 50.4	0.12	IX.
66 α^2 Geminor'm	2.1	7 26 37	3.84	57 50.4	0.12	A. XII, VI VII, (VII) IX.
BR. 1090.....	7	7 27 12	3.83	58 46.2	0.12	(VII), IX.
n^1 Puppis	4.5	7 29 2	2.54	113 12.3	0.13	VII.
n^2 Puppis	6	7 29 2	2.54	113 12.3	0.13	VII.
LL. 14738.....	8.5	7 29 3	4.45	41 57.3	0.12	A, XII.
GR. 1119.....	6	7 29 4	73.23	1 0.4	0.12	VII, (VII), IX.
W. B. VII, 898..	9	7 30 27	3.30	79 25.3	0.13	VI.
P. VII, 161.....	6.7	7 31 38	3.63	65 29.7	0.13	(VII.)
GR. 1348.....	6	7 31 47	4.84	34 56.9	0.13	(VII), IX.
BR. 1105.....	9	7 31 50	3.19	84 38.7	0.13	(VII), IX.
BR. 1101.....	7	7 31 54	3.85	57 42.4	0.13	IX.
P. VII, 156	6	7 31 58	4.47	41 34.8	0.13	A, XII.
VII, 584.....	....	7 32 5	3.53	69 27.4	0.13	VII.
BR. 1107.....	7	7 33 29	3.19	84 29.0	0.13	(VII), IX.
k^1 Puppis.....	.... 4.5	7 33 42	2.46	116 31.1	0.13	VII, (VII), IX.
k^2 Puppis....	....	7 33 42	2.46	116 31.2	0.13	VII, (VII), IX.
BR. 1104.....	6	7 34 36	4.57	39 16.4	0.13	(VII), IX.
P. VII, 132.....	6.5	7 35 31	+10.22	9 25.5	+0.13	(VII), IX.

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VII, 589.....	Var	7 35 33	+3.61	66 15.5	+0.13	VII.
P. VII, 179.....	7	7 35 56	3.58	67 18.3	0.13	A, XII.
P. VII, 182.....	....	7 36 26	3.63	65 27.5	0.13	A, XII.
VI, 569.....	....	7 36 26	3.29	79 44.6	0.13	VI.
Gr. 1363.....	7.8	7 38 35	6.84	17 54.3	0.14	IX.
P. VII, 155.....	6.7	7 39 10	10.08	9 49.1	0.14	VII, (VII), IX.
ι Puppis (1st star).	7.8	7 39 44	2.76	104 23.0	0.14	(VII), IX.
ι Puppis (2d star)	7	7 39 44	2.76	104 23.1	0.12	(VII), IX.
P. VII, 199.....	6.7	7 41 14	4.76	35 33.7	0.14	(VII), IX.
VII, 594.....	Var	7 41 48	3.61	65 57.3	0.14	VII, (VII).
XII, 699.....	....	7 42 2	3.63	65 24±	0.14	XII.
Ll. {15183 / 15187}	8½	7 42 4	3.63	65 25.1	0.14	A, XII.
B. F. 1083... ...	7	7 42 12	3.73	61 29.4	0.14	IX.
Ll. 15285.....	6.7	7 43 47	2.52	114 36.0	0.14	A, XII, VI, VII, (VII).
P. VII, 224.....	7	7 44 41	3.51	70 21.5	0.15	VII.
P. VII, 187.....	5	7 45 2	9.71	10 11.1	0.15	(VII), IX.
Gr. 1374.....	6.5	7 45 12	7.33	15 45.2	0.15	A, XII, VI, VII, (VII) IX.
Ll. 15303.....	8	7 45 56	3.98	52 56.3	0.15	XII.
VI, 580..... ...	....	7 46 27	3.40	73 28.5	0.15	VI.
Gr. 1359.....	6	7 46 42	15.22	5 35.1	0.14	XII.
P. VII, 250.....	5	7 47 36	2.26	124 23.6	0.15	IX.
U Geminorum...	Var	7 47 41	3.56	67 40.4	0.15	VII, (VII), IX.
VII, 602.....	....	7 47 43	3.57	67 35.2	0.15	VII.
VII, 603.....	....	7 47 48	3.56	67 44.5	0.15	VII.
Ll. 15402.....	8½	7 48 39	3.98	52 46.4	0.15	XII.
P. VII, 249.....	6	7 48 44	3.26	80 48.4	0.15	VI.
Lac. 3072.....	6	7 51 24	2.38	119 57.2	0.16	VII, (VII).
P. VII, 251.....	6	7 51 30±	+5.23	28 40.1	+0.16	IX.

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P. VII, 277	6.5	7 52 41	+2.41	120 0.0	+0.16	VII. (VII), IX.
P. VII, 272	7	7 53 31	3.51	69 50.6	0.16	VI, VII.
Oe. A.8510.....	7	7 53 53	4.64	36 45.9	0.16	VI.
B. A. C. 2666...	6.7	7 54 16	2.69	108 3.5	0.16	VII.
XII, 714.....	....	7 54 40±	3.50	69 50.6	0.16	XII.
Ll. 15646	6.5	7 54 48	3.50	69 55.9	0.16	A, XII, VI.
(VII), 998... ...	9.10	7 55 25	3.61	65 25.1	0.16	(VII.)
VI, 588....	....	7 56 30	3.62	65 9.5	0.16	VI.
Ll. 15707	9	7 56 39	3.61	65 8.5	0.16	VI.
Gr. 1400.....	6.7	7 57 21	6.29	19 55.3	0.16	VII, (VII), IX.
B. F. 1128	6	7 57 32	3.48	70 48.4	0.16	(VII), IX.
P. VII, 282	6	7 57 50	5.70	23 58.8	0.17	IX.
P. VII, 301	6	7 58 12	2.35	122 6.8	0.16	VI.
Br. 1158.....	7	7 59 12	3.55	67 11.0	0.16	VI.
Br. 1159.....	6	8 0 48	4.15	47 12.4	0.17	A, XII.
Gr. 1403.....	5	8 1 1	7.75	13 52.9	0 17	IX.
W. VII, 1789 ...	8	8 1 45	2.99	94 0.6	0.17	XII.
P. VII, 308	8	8 2 3	3.91	54 10.3	0.17	XII.
Br. 1147.....	6	8 3 47	7.75	13 51 9	0.17	(VII), IX.
P. VII, 321	6.7	8 3 49	3.79	57 9.1	0.18	VII, (VII).
B. F. 1132 .. / P. VII, 311..	6.5	8 3 51	4.81	33 10.6	0.17	A, XII.
B. F. 1149 .. / P. VIII, 3 ..	6.5	8 4 28	3.28	79 48.5	0.17	A, XII.
16 ζ^1 Cancri	5.4	8 5 2	3.45	71 58.5	0.17	A, XII, VI, VII.
ζ^2 Cancri	7.8	8 5 3	3.45	71 58.7	0.18	A, XII, VI, VII (VII), IX.
Ll. 16019.....	7	8 5 23	3.37	75 37.4	0.17	VII, (VII), IX.
VII, 626.....	....	8 6 31	3.42	72 58.6	0.17	VII.
Br. 1169.....	6.7	8 6 37	5.01	30 25.9	0.18	(VII), IX.
Br. 1160.....	6.7	8 6 51	+6.75	17 12.5	+0.18	(VII), IX.

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VII, 627	....	8	7	0	+3.44	72	10.7	+0.17	VII.
{B. F. 1157. P. VIII, 14.}	7	8	7	2	3.44	71	57±	0.17	XII.
Santini, 569	8.9	8	7	22	3.10	88	22±	0.17	VI.
XII, 734	8.9	8	7	23	3.11	88	21.9	0.17	XII.
Ll. 16083	6	8	8	38	4.67	35	28.5	0.18	A, XII.
Ll. 16085	6	8	8	47	4.68	35	3.0	0.18	A, XII.
Ll. 16157	8	8	9	2	3.08	89	42.5	0.18	XII.
VII, 629	Var	8	9	40	3.32	77	53.5	0.18	VII, (VII).
XII, 741	....	8	9	59	3.07	89	52±	0.18	XII.
VI, 605	....	8	10	0±	3.08	89	49.6	0.18	VI.
W. B. VIII, 217.	8.9	8	10	4	3.07	89	52.9	0.18	XII, VI.
XII, 743	....	8	10	7	3.08	89	52±	0.18	XII.
W. VIII, 245	8	8	11	18	3.14	86	49.3	0.18	XII.
W. B. VIII, 262	8	8	11	37	3.26	80	27.7	0.18	VII, (VII).
P. VIII, 30	6	8	12	13	5.09	28	58.5	0.18	(VII), IX.
P. VIII, 42	6	8	13	3	3.52	68	51.5	0.18	IX.
P. VIII, 44	6	8	13	15	3.15	85	39.6	0.18	VII.
P. VIII, 40	5	8	14	20	4.59	36	22.7	0.18	XII, VII.
W, VIII, 342	8.9	8	14	38	3.16	85	13.6	0.18	XII.
XII, 750	....	8	15	36	3.20	83	38.2	0.18	XII.
Gr. 1433	6	8	16	15	4.08	47	35.3	0.19	IX.
Gr. 1434	8	8	16	16	4.08	47	37.0	0.19	IX.
Br. 1188	7	8	17	39	3.43	72	24.7	0.19	(VII)
P. VIII, 46	6	8	17	57	5.77	22	17.7	0.19	VII, (VII), IX.
Gr. 1418	6	8	18	25	17.03	4	30.6	0.19	VI, VII, (VII), XI.
Arg. zone + 2° No. 1965.	6.7	8	19	6	3.12	87	29.5	0.19	IX.
23 φ^3 Cancri.... (1st star.)	6	8	19	13	3.64	62	39.6	0.19	A, XII, VI.
23 φ^3 Cancri.... (As one mass.)	....	8	19	14	+3.64	62	40±	+0.19	XII, IX.

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		h.	m.	s.	s.	°	′	′	
23φ^2 CANCRI, (2d star).....	6	8	19	14	+3.64	62	39.4	+0.19	A, XII, VI.
24ν^1 CANCRI, (1st star)... ...	7	8	19	14	3.58	65	3.4	0.19	VI.
24ν^2 CANCRI....	7.8	8	19	14	3.58	65	3.3	0.19	VI.
Arg. Zone +2°, No. 1967	7.8	8	19	20	3.11	88	1.1	0.19	IX.
P. VIII, 69	4.3	8	19	25	3.01	93	30.0	0.19	VII.
W. B. VIII, 484	9	8	19	53	3.29	78	55.9	0.19	VI.
Arg. Zone +1°, No. 2095.....	8	8	20	4	3.10	88	45.8	0.19	IX.
P. VIII, 52	6	8	20	30	6.03	20	15.8	0.19	IX.
LL. 16596.....	9	8	20	57	3.40	73	16.8	0.19	(VII.)
Arg. Zone +0°, No. 2305.....	8.7	8	21	50	3.08	89	20.6	0.19	IX.
P. VIII, 71.....	7.8	8	22	0	4.55	36	27.7	0.19	(VII.)
Arg. Zone +0°, No. 2310.. ...	8.7	8	22	44	3.07	89	53.1	0.19	IX.
Arg. Zone −0°, No. 2000.....	9.8	8	23	8	3.06	90	32.7	0.20	IX.
P. VIII, 78	6	8	23	10	4.54	36	27.8	0.20	(VII), IX.
VII, 644.....	....	8	23	26	3 33	76	39.1	0.19	VII.
(VII) 1049	9.10	8	23	27	3.33	76	44.2	0.20	(VII.)
GR. 1431.....	6	8	23	35	11.51	7	19.5	0.20	IX.
LL. 16733.....	9	8	24	40±	3.33	76	49.9	0.20	XII.
GR. 1450.....	6.7	8	24	47	3.93	51	33.4	0.20	IX.
W. VIII, 618..	8	8	25	17	3.33	76	46.7	0.20	XII.
GR. 1446.....	6	8	25	45	6.85	15	56.2	0.20	IX.
VII, 647.....	....	8	27	4	3.32	77	12.9	0.20	VII, (VII).
VII, 648.....	....	8	27	17	3.31	77	15.8	0.20	VII, (VII).
LAC. 3386	6	8	27	59	2.32	121	6.3	0.20	(VII).
GR. 1458.....	6	8	29	2	4.53	36	9.9	0.20	XII.
LAC. 3406.....	6	8	30	11	2.55	116	24.8	0.20	VII.
P. VIII, 110 ...	6.7	8	30	30	3.77	56	45.8	0.20	VII, IX.
BR. 1215.....	7	8	31	44	+3.76	57	2.8	+0.21	(VII).

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P. VIII, 118....	7.8	8	31	55	+3.47	69	53.1	+0.21	IX.
BR. 1216	6.7	8	32	8	3.76	56	50.0	0.21	(VII), IX.
BR. 1219	7	8	32	33	3.74	57	37.1	0.21	(VII).
GR. 1452	9	8	32	40	9.32	9	32.3	0.21	A, XII, VI, VII, IX.
VII, 656	9.10	8	33	3	3.30	77	57.1	0.21	VII, (VII),
W. VIII, 834...	8	8	33	4	3.19	83	47.1	0.21	XII.
W. VIII, 835...	9	8	33	5	3.19	83	46.8	0.21	XII.
BR. 1228.....	7	8	34	39	3.46	69	40.9	0.21	(VII).
B. F. 1220	....	8	36	39	4.58	34	29.2	0.21	A, XII, VI.
VII, 663.....	Var	8	36	47	3.44	70	31.1	0.21	VII, (VII).
LL. 17161 ..... (1st star).	....	8	36	55	4.01	47	51.2	0.21	VI, VII,
LL. 17161..... (2d star).	9.10	8	36	56	4.01	47	50.8	0.21	VI, VII.
GR. 1463.....	6	8	37	2	9.25	9	30.4	0.21	A, XII, VI VII, (VII) IX.
VII, 665.....	....	8	37	16	3.28	78	33.2	0.21	VII, (VII).
P. VIII, 137	6	8	37	28	5.53	22	50.1	0.21	IX.
BR. 1238	6	8	37	32	2.95	96	47.1	0.21	(VII).
LL. 17237	8	8	38	38	3.44	70	29.9	0.21	VII.
W.B.(2)VIII,958.	8.9	8	39	6	3.65	60	46.7	0.21	IX.
OE. A. 9304	8.9	8	40	0±	4.71	31	53.7	0.21	VI.
A, 475	....	8	40	2	4.71	31	59±	0.21	A, XII.
11 Hydrae .. (1st star.)	3.4	8	40	9	3.18	83	7.4	0.21	IX.
11 Hydrae .. (2d star.)		8	40	9	3.18	83	7.4	0.21	IX.
LL. 17275.....	8.5	8	41	45	4.70	32	0.4	0.21	A, XII.
BR. 1245	6.7	8	42	46	3.76	56	15.0	0.22	(VII).
P. VIII, 188	6	8	44	50±	2.53	119	0.0	0.22	XII.
LL. 17454.....	8	8	44	59	3.29	77	38.3	0.22	(VII.)
B. F. 1236	7	8	45	58	5.31	24	0.0	0.22	(VII).
57 Cancri ..... (1st star).	6.7	8	46	37	+3.68	58	56.9	+0.22	IX.

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57 Cancri..... (as one mass).	6	8 46 37	+3.68	58 57.0	+0.22	IX.
57 Cancri..... (2nd star.)	6 7	8 46 37	3.68	58 57.0	0.22	IX.
LL. 17513.....	9	8 46 48	3 49	67 18.4	0.22	VI.
VII, 676	Var	8 47 3	3.14	86 27.7	0.22	VII, (VII).
LL. 17528.....	7.5	8 47 5	3.49	67 18.5	0.22	VI.
17 Hydrae..... (1st star).	....	8 49 22	2.94	97 29.5	0.22	(VII),
17 Hydrae ..... (2nd star).	7	8 49 22	2.94	97 29.6	0.22	(VII).
VII, 679.....	Var	8 49 32	3.44	69 40.4	0.22	VII, (VII).
(VII), 1108.....	Var	8 49 35	2 92	98 39.9	0.22	(VII).
A, 480.....	....	8 50 14	3.47	68 10.0	0.22	A, XII, VI.
GR. 1493.....	8.9	8 50 43	4.20	41 15.0	0.23	VII, (VII).
B. F. 1267	6.7	8 50 58	3.24	80 7.9	0.23	IX.
LL. 17690.....	8	8 51 45	3.46	68 21.2	0.23	A, XII.
GR. 1480.....	6	8 52 23	9.47	8 40.3	0.22	A, XII, VI.
VII, 685.....	9.10	8 52 28	3.32	75 32.2	0.23	VII, (VII).
P. VIII, 233....	6.7	8 54 56	3.19	83 52.3	0.23	VII.
LL. 17818..... .	8.5	8 55 34	3.47	67 59.5	0.23	VI.
LAC. 3636	6	8 55 46	2.58	116 10.3	0.23	(VII).
P. VIII, 245.	5	8 58 34	3.85	51 3.0	0.24	A, XII, VII, IX.
VII, 692.....	....	8 59 12	3.31	75 53.5	0.23	VII, (VII).
BR. 1282.....	7.8	8 59 15	3.38	72 23.3	0.23	(VII).
σ^2 Ursae Majoris (1st star).	....	8 59 21	5.37	22 22.1	0.27	VII.
13 σ^2 Ursae Maj (2nd star).	5	8 59 22	5.37	22 22.1	0.27	VII.
BR. 1283	7.8	8 59 25	3.34	74 13.6	0.23	IX.
A, 488.....	....	9 0 0±	3.45	68 26.8	0.23	A, XII.
LL. 17973	9.5	9 0 35	3.45	68 29.5	0.24	A, XII, VI.
GR. 1517.....	6	9 3 16	6.22	16 32.3	0.24	IX.
LL. 18105	9	9 4 38	+3.43	69 3.7	+0.24	VI.

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VI, 660.	....	9 5 22	+3.40	70 48.9	+0.24	VI.
A, 494.	....	9 5 35	3.43	68 48.6	0.24	A, XII, VI.
B. F. 1301.	6	9 5 41	3.14	85 37.3	0.24	VI, VII.
XII, 811.	....	9 6 18	3.44	68 34.7	0.24	A, XII.
Br. 1299.	6.7	9 6 29	3.44	68 12.3	0.25	VII, IX.
Br. 1300.	6	9 7 34	3.71	54 51.1	0.24	VII, (VII), IX.
38 Lyncis, (1st star).	4	9 11 3	3.75	52 40.2	0.25	IX.
38 Lyncis, (2nd star).		9 11 4	3.75	52 40.2	0.25	IX.
VII, 710.	9	9 11 11	3.37	71 44.9	0.25	VII, (VII).
A, 498.	....	9 11 30	3.43	68 39.8	0.25	A, XII.
W. IX, 214.	8	9 11 37	3.03	92 51.8	0.25	XII.
Br. 1306	6	9 12 12	4.21	38 10.9	0.25	(VII.)
W. B. IX, 234.	9	9 12 58	3.28	76 44.9	0.25	VII, (VII).
P. IX, 50.	7.8	9 13 36	3.39	70 22.9	0.25	IX.
A, 501.	....	9 13 50±	3.50	64 17.7	0.25	A, XII.
Br. 1313.	7	9 13 53	3.48	64 18.2	0.25	A., XII.
Br. 1310.	6	9 14 0	4.14	39 55.6	0.25	IX.
Br. 1316.	7	9 14 15	2.94	99 4.9	0.25	(VII).
P. IX, 51	7	9 15 39	4.92	25 31.4	0.25	IX.
Br. 1318.	7.8	9 16 18	3.49	64 17.0	0.25	VII.
Ll. 18481	....	9 16 44	3.41	69 6.2	0.25	A, XII.
Br. 1319	6.7	9 16 51	3.51	63 32.8	0.25	(VII).
P. IX, 69,	7	9 17 6	3.18	84 14.7	0.25	VII.
Br. 1321	7	9 17 43	3.39	69 40.5	0.26	(VII).
VII, 718.	9.10	9 18 27	3.27	77 16.7	0.25	VII, (VII).
P. IX, 74.	7	9 18 37	3.35	72 52.6	0.25	VII, IX.
W. B. (2) IX, 390	7.8	9 19 33	3.38	70 24.1	0.26	IX.
P. IX, 87.	4.5	9 19 5	+9.08	8 7.5	+0.26	A. XII, VI VII, (VII) IX.

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W. B IX, 439 ..	5	9 21 36	+2.99	95 31.6	+0.26	VII.
W. B. IX, 465 ..	8	9 22 49	3.04	92 12.4	0.26	XII, IX.
VI, 670.....	....	9 22 54	3.47	64 46.5	0.26	VI.
A, 508.....	....	9 23 59	3.38	69 59.6	0.26	A, XII.
GR. 1552.....	7.8	9 24 14	4.04	41 7.1	0.26	VII, (VII).
GR. 1553.:.....	7.8	9 24 19	4.03	41 17.1	0.26	VII, (VII.)
VI, 672.....	....	9 24 19	3.47	65 2.2	0.26	VI.
W. B. IX, 563...	9	9 26 55	3.26	77 21.5	0.26	VII, (VII.)
GR. 1559.....	7	9 27 32	4.03	40 57.2	0.26	VII, (VII).
W. B. IX, 611...	8.9	9 28 50±	3.15	84 48.4	0.26	XII, VI.
P. IX, 124.....	6	9 29 18	3.58	58 16.7	0.26	(VII.)
VII, 739.... ...	9.10	9 29 20	3.25	77 40.1	0.26	VII, (VII).
W. IX, 637	8	9 29 32	3.15	84 55.5	0.26	XII.
P. IX, 112.....	6	9 31 15	7.14	11 17.8	0.26	(VII.)
GR. 1564.....	6	9 31 31	5.27	20 11.7	0.27	IX.
W. IX, 676	8	9 31 45	3.19	81 43.8	0.27	XII.
P. IX, 135	6.7	9 31 54	3.39	69 8.5	0.27	(VII), X.
GR. 1562.....	6	9 32 22	7.49	10 17.5	0.27	A, XII, IX.
BR. 1361.....	7	9 34 14	2.92	100 12.3	0.27	(VII.)
GR. 1573.....	7	9 34 29	3.99	41 0.1	0.27	VII, (VII).
VII, 748..... ..	....	9 35 37	3.34	71 22.7	0.27	VII, (VII).
LL. (F.) 1479....	8.9	9 36 23	18.92	2 49.8	0.27	VII, (VII), IX.
P. IX, 158.....	7	9 36 23	3.39	69 14.2	0.27	IX.
BR. 1364.....	6	9 37 40	4.31	32 18.0	0.27	(VII), IX.
BR. 1363.... ...	6	9 37 59	4.64	26 10.3	0.27	A, XII, IX.
P. IX, 163.....	7	9 38 9	3.42	65 57.0	0.27	VI.
W. IX, 828	9	9 38 50±	3.11	87 7.7	0.27	XII.
B. F. 1383.....	5.6	9 39 34	+3.17	82 43.9	+0.27	VII, (VII).

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VII, 754...	....	9	40	33	+3.24	77	59.6	+0.27	VII.
Br. 1373.....	Var	9	40	50	3.23	77	59.6	0.28	VII, (VII).
Ll. 19273–4.....	8	9	44	6	3.70	49	47.6	0.28	IX.
P. IX, 187.....	6	9	47	10	5.54	16	31.6	0.28	(VII), IX.
Br. 1393.....	6	9	49	48	3.19	80	28.5	0.28	(VII.)
Br. 1383.....	8	9	50	13	5.77	14	38.5	0.28	A, XII.
VI, 688.....	....	9	50	26	3.25	76	15.0	0.28	VI.
Lac. 4072.....	6	9	50	44	2.66	120	29.9	0.28	VII, (VII), IX.
Br. 1396.....	6	9	51	30	3.19	81	5.4	0.28	(VII).
VI, 690.....	....	9	51	45	3.25	76	9.8	0.28	VI.
P. IX, 221.....	6	9	52	24	3.50	59	45.5	0.29	(VII), IX.
W. IX, 1129....	8.9	9	53	40	3.16	83	0.0	0.28	XII.
Ll. (F.) 1519.....	9	9	55	20	21.82	2	6.2	0.28	VII.
P. IX, 230.....	6	9	55	51	3.36	67	27.0	0.29	(VII), IX.
B. F. 1414 / P. IX, 229 ..	6	9	56	17	4.04	35	30.4	0.29	XII.
Gr. 1609.....	6.7	9	59	56	4.48	25	26.3	0.29	XII, IX.
P. IX, 249.....	9	10	1	33	3.22	77	23.6	0.29	A, XII, VI, VII.
Br. 1408.....	6.7	10	2	17	3.30	70	51.4	0.29	(VII), IX.
P. IX, 254.....	6.7	10	3	26	3.64	48	43.5	0.29	(VII), IX.
Br. 1414.....	6	10	5	3	3.01	96	42.1	0.29	IX.
VII, 780.....	....	10	5	32	3.30	70	42.7	0.29	VII, (VII).
Br. 1416.....	8	10	7	0	3.47	57	57.4	0.29	(VII), IX.
P. X, 10	7	10	7	37	3.33	68	12.5	0.29	VI.
Gr. 1626.....	8.9	10	8	40	3.67	46	34.8	0.29	VI, VII.
P. X, 23.....	6	10	9	27	3.28	71	38.3	0.30	VII, IX.
Gr. 1635.....	7	10	11	0	3.66	46	19.5	0.30	VI, VII.
Br. 1399.....	6	10	11	9	9.81	5	6.9	0.30	A, XII, VI, VII, IX.
P. X, 26.....	6	10	11	30	+4.68	20	37.5	+0.30	IX.

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W. B. X, 170...	8.9	10	11	43	+3.23	75	26.6	+0.30	VII.
A, 536.....	....	10	12	40±	2.97	99	17.2	0.30	A, XII.
VI, 703.....	....	10	12	44	3.33	66	52.0	0.30	VI, VII,
(VII), 1248.....	10.11	10	12	45	3.30	69	28.7	0.30	(VII).
(VII), 1249.....	9.10	10	12	50	3.30	69	30.1	0.30	(VII).
W. B. X, 197....	8	10	12	58	2.98	98	42.7	0.30	A, XII.
41 γ^1 Leonis..	2 (as one mass)	10	13	5	3.32	69	31.6	0.30	A, XII, VII (VII).
41 γ Leonis...									XII, VII.
41 γ^2 Leonis..		10	13	5	3.32	69	31.6	0.30	A, XII, VII (VII).
A, 537.....	....	10	13	5	2.97	99	19.6	0.30	A, XII.
BR. 1430.....	6	10	13	34	3.63	47	31.4	0.30	(VII).
W. B. (2) X, 243.	9	10	13	39	3.61	48	9.6	0.30	IX.
BR. 1433.....	6	10	14	44	3.59	48	8.2	0.30	XII, (VII), IX.
BR. 1429.....	5	10	15	6	4.43	23	48.2	0.30	VII, (VII), IX.
P. X, 22	5	10	15	38	7.89	6	48.5	0.30	XII, VI, IX.
P. X, 51	6.7	10	15	39	3.16	80	24.4	0.30	IX.
W. X, 258	7.8	10	16	29	2.98	98	45.9	0.30	A, XII.
B. F. 1476	6	10	17	13	3.04	93	0.7	0.30	VII.
W. B. X, 285....	8.9	10	18	19	3.21	76	38.2	0.30	VII.
W. B. X, 290....	8	10	18	23	3.07	90	9.4	0.30	A, XII, VI.
BR. 1447.... ...	6.7	10	19	30	3.01	96	25.8	0.30	(VII).
BR. 1449.....	7.8	10	20	2	3.09	95	47.5	0.30	(VII).
GR. 1646.....	6	10	20	20	3.74	40	32.9	0.32	VII, (VII).
W. X, 335	9	10	20	30±	3.07	90	24.2	0.30	XII.
W. B. X, 334....	8	10	20	37	3.20	76	55.1	0.30	VII.
P. X, 77.....	7	10	21	12	3.08	90	19.7	0.31	XII, (VII).
VII, 810.....	....	10	22	7	3.55	49	35.5	0.30	VII.
P. X, 83	6	10	22	8	+3.22	75	1.0	+0.30	VI, VII, IX

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Br. 1456	6.7	10	22	24	+3.04	93	6.2	+0.30	IX.
Gr. 1648.....	8.7	10	22	25	3.77	88	22.0	0.30	IX.
W. B. X, 378 ...	7	10	22	47	3.20	77	10.4	0.30	VII.
Br. 1439.....	6	10	23	2	6 59	8	51 7	0.30	VII, IX.
Br. 1446.....	5.4	10	24	25	5.30	13	38.5	0.30	XII, VI, (VII), IX.
Br. 1462.....	6.7	10	24	43	3.01	96	59.9	0.31	(VII).
VII, 818	....	10	25	53	3.21	75	44.9	0.31	VII.
Gr. 1658.....	5	10	25	56	3.54	48	55.9	0.31	VII.
XII, 900	....	10	28	26	2.96	102	18.8	0.31	A, XII.
Br. 1472.....	6.7	10	29	1	2.83	112	31.8	0.30	(VII).
W. X, 497	7	10	29	13	2.96	102	12.7	0.31	A, XII.
W. X, 505	8	10	29	29	2.96	102	21.3	0.31	A, XII.
W. B. X, 500....	7.8	10	29	34	3.21	75	32.4	0.31	VII.
φ^3 Hydrae	6	10	30	11	2.93	105	41.9	0.31	(VII).
Br. 1458.....	6	10	31	3	6.34	8	55.3	0.31	VI, VII, IX.
Gr. 1668.....	6	10	31	20	3.78	35	40.8	0.31	(VII).
φ^3 Hydrae.....	5	10	32	30	2.92	106	13.7	0.31	(VII).
Gr. 1669.....	6	10	32	53	4.38	20	54.2	0.31	VII, (VII), IX.
A, 551.....	....	10	33	7	2.95	103	51.2	0.31	A, XII.
Gr. 1671..... ..	8.9	10	33	30±	4.37	20	44.7	0.31	(VII).
VII, 829.....	....	10	33	55	3.20	75	46.9	0.31	VII.
B. F. 1510... / P. X, 126 ...	5	10	34	5	4.39	20	16.2	0.31	A, XII, VI, IX.
XII, 906	....	10	34	6	4.58	17	49±	0.31	XII.
W. B X, 604....	7·8	10	35	6	3.17	78	35.4	0.31	VII.
P. X, 131	6.7	10	35	11	3.38	57	39.0	0.31	(VII), IX.
(VII), 1299.....	Var	10	35	46	4.35	20	34.1	0.31	(VII).
VI, 721....	....	10	35	46	4.57	17	49.8	0.31	VI, VII.
P. X, 135	5	10	36	12	+3.56	43	8.3	+0.31	(VII).

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BR. 1485.....	5	10 36 37	+3.28	66 9.4	+0.31	(VII), IX.
P. X, 137	7.8	10 36 40	3.56	43 8.1	0.31	(VII).
35 Sextantis.. (1st star).	....	10 36 51	3.12	84 35.8	0.31	(VII).
35 Sextantis.. (2nd star)	6	10 39 52	3.12	84 35.8	0.31	(VII).
BR. 1489.....	7.8	10 36 52	2.88	112 53.7	0.31	(VII).
P. X, 143	6	10 36 56	2.76	122 3.5	0.31	XII, VI.
LL. 20748	6.7	10 39 42	3.18	76 35.5	0.31	VII.
b^1 Hydrae.....	6	10 40 45	2.94	106 38.2	0.31	(VII).
VII, 839.....	....	10 42 25	3.17	77 17.3	0.31	VII.
40 Sextantis.. (1st star).	....	10 42 57	3.05	93 21.7	0.31	(VII).
40 Sextantis.. (2nd star).	6	10 42 57	3.05	93 21.7	0.31	(VII).
W. B. X, 781....	7	10 44 34	3.17	77 45 6	0.32	VII.
b^2 Hydrae.....	5	10 44 59	2.94	107 40.2	0.32	(VII).
P. X, 170.....	7.6	10 44 59	3.65	36 46.3	0.32	IX.
P. X, 171.....	6.7	10 45 1	3.65	36 50.0	0.32	IX.
XII, 920.....	....	10 46 50±	3.92	26 22.7	0.32	XII.
XII, 921.....	....	10 47 0±	3.92	26 23.1	0.32	XII.
GR. 1702.....	8	10 47 0	3.92	26 23.2	0.32	A, XII, VI.
b^3 Hydrae.....	5.6	10 47 23	2.93	109 27.9	0.32	(VII).
BR. 1514.....	6	10 48 49	3.35	55 49.6	0.32	VII, (VII).
54 Leonis ..... (1st star).	4.5	10 48 51	3.27	64 35.1	0.32	VII.
54 Leonis..... (2nd star).	8	10 48 51	3.27	64 35.1	0.32	VII, (VII), IX.
BR. 1508.....	6	10 49 54	5.02	11 33.7	0.32	IX.
P. X, 199	5.6	10 50 54	2.77	126 28.1	0.32	VII, (VII).
P. X, 205	7	10 53 9	3.15	77 37.6	0.32	VII.
BR. 1521	7	10 54 11	4.59	13 53.0	0.32	(VII), IX.
P. X, 212.....	7	10 54 40	3.10	89 16.9	0.32	VII.
A, {564 / 565}	....	10 54 42	+3.82	26 12.4	+0.32	A, XII.

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		h. m. s.	s.	° ′	′	
XII, 927	....	10 54 50±	+3.84	26 10.9	+0.32	XII.
Ll. 21170	8	10 55 45	3.14	80 27.5	0.32	A, XII.
Br. 1531	6	10 56 22	2.90	116 9.3	0.32	(VII).
W.B.(2) X, 1112.	7.8	10 56 30	3.30	53 11.6	0.40	VII, (VII), IX.
P. X, 225	7	10 56 51	3.07	90 4.6	0 33	(VII).
W. X, 1006	9	10 57 13	3.13	80 35.7	0.32	A, XII.
XII, 931	8.9	10 57 22	3.89	23 30.3	0.32	A, XII.
P. X, 228	8	10 57 47	3.37	51 4.8	0.32	(VII).
Ll. 21226	7.8	10 57 51	3 11	84 5.9	0.31	(VII).
XII, 933	7.8	10 58 11	3.88	23 26.9	0.32	A, XII.
Ll. (F) 1729	8	10 58 20±	15.19	1 40.9	0.32	VII, (VII). IX.
W. B. (2) X, 1174	8.9	10 59 16	3.01	45 49.9	0.31	(VII), IX.
A, 572	....	10 59 23	3.91	23 28.6	0.32	A, XII.
Ll. 21264	7.8	10 59 40	3.12	82 11.2	0.32	VII.
Br. 1538	5	10 59 54	2.90	116 36.7	0.32	VII.
W.B. (2) X, 1188.	6	11 0 6	3.19	71 35.2	0.32	IX.
W. B. X, 1075	7	11 0 42	3.14	79 6.7	0.32	VII.
Ll. 21322	7.8	11 1 47	3.10	85 47.4	0.32	VII, (VII).
P. X, 252	6	11 2 26	3.31	53 0.8	0.32	(VII), IX.
P. X, 254	6.7	11 2 38	3.39	46 6.9	0.32	IX.
P. XI, 2	5	11 3 53	2.86	121 41.5	0.33	VII.
Ll. 21367	7.8	11 3 54	3.14	78 9.3	0.32	VII.
W. B. XI, 25	7	11 4 5	3.14	78 1.2	0.32	VII.
Oe. A. (N.), 11509	6.7	11 4 11	3.91	21 3.0	0.32	IX.
Gr. 1746	6.7	11 5 27	3.53	34 25.6	0.32	VII, (VII), IX.
P. XI, 9	7	11 7 7	3.17	69 11.2	0.33	(VII).
B. F. 1589	6	11 7 29	3.09	87 3.2	0.33	VI, VII.
P. XI, 12	6	11 7 32	+3.13	81 15.3	+0.33	A, XII, VII, IX.

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P. XI, 22.....	6	11 9 26	+3.14	76 28.3	+0.33	(VII), IX.
P. XI, 19.....	6	11 9 39	3.43	39 50.5	0.33	(VII).
53 ξ^1 Ursae Majoris.....	4.3	11 11 31	3.21	57 45.8	0.33	VI, VII, IX.
53 ξ^2 Ursae Majoris.....		11 11 31	3.21	57 45.7	0.33	VI, VII, IX.
RUEMKER 3507		11 11 38	3.62	27 7±	0.33	A, XII, VI.
P. XI, 31.....	7	11 11 50	3.15	77 20.0	0.33	VII.
XII, 947.....	....	11 14 12	4.31	11 56.6	0.33	XII.
P. XI, 41.....	7	11 14 33	3.11	84 26.1	0.33	IX.
P. XI, 43.....	6	11 15 25	3.63	24 59.2	0.33	VII, (VII), IX.
P. XI, 55.....	5	11 17 10	2.91	125 28.9	0.33	VI, VII.
P. XI, 60.....	6	11 18 30	3.13	77 53.1	0.33	VII, (VII).
P. XI, 59.....	6	11 18 54	3.44	33 27.9	0.33	A, XII, VII.
A, {585 / 586}.....	8	11 19 38	3.55	26 11.8	0.33	XII.
P. XI. 69.....	7	11 19 50	3.12	80 39.3	0.33	VII.
VII, 894.....	....	11 20 1	3.09	85 84	0.33	VII.
83 Leonis (1st star).....	7	11 20 25	3.03	86 18.5	0.33	VII.
83 Leonis (2d star).....	7.8	11 20 26	3 03	86 18.9	0.33	VII.
P. XI, 71.....	7.8	11 20 28	3.09	86. 18.9	0.33	XII, VI.
W. B. XI, 349..	8	11 21 32	3.09	86 28.9	0.33	XII, VI, VII.
P. XI, 74.....	6.7	11 21 55	3.50	27 32.5	0.33	XII, IX.
GR. 1782.....	6	11 22 56	4.56	8 11.1	0.33	IX.
P. XI, 85.....	7	11 23 13	3.11	81 42.7	0.33	VII.
GR. 1797.....	6	11 25 15	3.45	28 13.5	0.33	IX.
LL. 21898.....	9.10	11 25 17	3.10	74 56.1	0.33	(VII).
LL. (F.) 1875....	7.8	11 25 50	6.15	3 41.6	0.33	(VII), IX.
17 Crateris (1st star).....	6½	11 26 4	2.96	118 34.7	0.33	XII, VII.
17 Crateris (2d star).....	5	11 26 5	2.96	118 34.7	0.33	XII, VII.
P. XI, 98.....	7	11 26 26	+3.04	97 8.3	+0.33	A, XII.

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Br. 1579.....	5.6	11	26	44	+2.97	120	23.8	+0.33	(VII).
Br. 1580.....	4	11	26	52	2.94	121	10.0	0.33	VI, VII.
VI, 755.....	....	11	27	39	3.15	67	17.7	0.33	(VII), IX. VI.
90 Leonis .... (1st star.)	6	11	28	12	3.13	72	30.8	0.33	(VII).
90 Leonis..... (2nd star.)		11	28	12	3.13	72	30.7	0.33	(VII).
W. B. XI, 486...	9	11	29	13	3.03	103	59.5	0.33	VII, (VII).
P. XI, 111	6	11	29	43	3.17	61	31.7	0.33	VII, IX.
VII, 913.....	....	11	29	56	3.08	88	42.7	0.33	VII.
P. XI, 113	7	11	30	9	3.10	83	11.9	0.33	VII.
Gr. 1804.....	6	11	30	24	3.41	27	6.7	0.34	IX.
Ll. 22026.....	7	11	30	54	3.23	44	35.5	0.33	XII, VI.
VI, 760.....	....	11	30	57	3.06	94	43.0	0.33	VI.
W. B. XI, 534...	9	11	31	45	3.08	87	23.8	0.33	VII, (VII).
P. XI, 126	7	11	32	1	3.08	91	44.7	0.33	VII.
P. XI, 132.....	7	11	34	0	3.08	88	21.3	0.33	VII.
Br. 1594.....	5.6	11	34	0	2.96	124	3.0	0.33	(VII), IX.
VII, 920.....	....	11	34	20	3.08	87	45.8	0.33	VII.
Ll. 22150.....	6.5	11	35	36	3.00	113	41.5	0.33	A, XII.
P. XI, 144.....	7	11	35	44	3.06	84	33.6	0.33	VII, IX.
P. XI, 146.....	6	11	37	0	3.20	47	35.0	0.33	(VII), IX
VII, 924.....	....	11	38	42	3.08	88	23.8	0.33	VII.
W. B. XI, 657.	9	11	38	43	3.08	88	23.8	0.33	VII, (VII).
W. XI, 664	9	11	39	16	3.09	83	48.5	0.33	A, XII.
Gr. 1826	7.6	11	40	22	3.29	27	54.2	0.33	IX.
W. XI, 701	9	11	41	12	3.08	83	24.9	0.33	A, XII.
Br. 1604.....	6.7	11	42	13	3.09	75	1.2	0.33	(VII).
P. XI, 162	8	11	42	33	+3.10	74	47.9	+0.33	VI, VII.

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B. F. 1656.....	6	11	42	43	+3.08	84	7.0	+0.33	IX.
B. F. 1658.....	6	11	42	47	3.10	73	3.5	0.33	A, XII.
P. XI, 164.....	6	11	43	12	3.14	54	22.4	0.33	(VII).
A, 602.....	...	11	43	30±	3.11	71	25.1	0.33	A, XII.
B. A. C. 4005...	6	11	44	30	3.09	77	1.5	0.33	(VII), IX.
P. XI, 167.....	6	11	44	39	3.08	94	38.3	0.33	VII, (VII).
Gr. 1830.....	6.7	11	45	46	3.49	51	22.8	0.33	XII. VI, VII (VII). IX.
VII, 936.....	....	11	46	41	3.05	105	2.9	0.33	VII, (VII).
P. XI, 175... ..	5.6	11	47	8	2.99	124	23.1	0.33	IX.
P. XI, 179.....	7	11	47	29	3.09	93	4.8	0.33	VII.
P. XI, 180	7	11	47	40	3.10	84	25.5	0.34	IX.
VII, 939.....	....	11	47	54	3.08	84	57.5	0.33	VII.
W. B. XI, 804...	8	11	47	58	3.09	79	15.4	0.33	VII, (VII).
VI, 773.....	....	11	48	6	3.11	65	29.5	0.33	VI.
Lac. 4933.....	6	11	48	21	3.04	115	1.2	0.33	A, XII.
Ll. 22440	9½	11	48	25	3.08	83	30.2	0.33	A, XII, VI.
Br. 1610.....	7	11	48	41	3.15	42	50.0	0.33	(VII).
W. XI, 826.....	9	11	49	4	3.08	83	29.0	0.33	A, XII.
Br. 1614.....	6	11	49	19	3.04	117	46.8	0.33	(VII).
(VII), 1428.....	....	11	49	43	3.07	90	43.0	0.33	(VII).
Gr. 1838.....	6	11	50	21	3.18	27	45.2	0.33	IX.
Br. 1616.....	7	11	51	49	3.08	85	49.3	0.34	(VII), IX.
Ll. 22547	8	11	52	19	3.11	51	25.6	0.33	XII, VI, VII, (VII).
VII, 942.....	....	11	52	33	3.09	70	23.5	0.33	VII, (VII).
P. XI, 207.....	6.7	11	52	40	3.06	88	46.5	0.33	VII, IX.
W. B. XI, 890..	9	11	53	2	3.06	105	21.4	0.33	VII, (VII).
Gr. 1845.....	6	11	53	44	+3.33	8	27.0	+0.33	VII, (VII), IX.

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P. XI, 213	7	11	54	38	+3.08	91	4.0	+0.33	A, XII.
LL. 22608.....	9	11	55	7	3.11	46	15.6	0.33	A, XII, VI.
P. XI, 218	7	11	56	9	3.11	46	11.9	0.33	A, XII, VI.
VI, 781	....	11	56	57	3.08	81	0.1	0.33	VI.
LL. 22665.....	7.8	11	57	37	3.08	70	29.1	0.33	VII, (VII.)
2 Comae ..... (1st star.)	6	11	57	52	3.08	67	50.6	0.33	(VII.)
2 Comae ..... (2nd star)		11	57	52	3.08	67	50.6	0.33	(VII.)
P. XI, 227	7	11	58	19	3.08	85	43.8	0.34	IX.
GR. 1850.....	6	11	58	25	3.21	3	43.2	0.33	VI, VII, (VII), IX.
VII, 952.... ...	....	11	59	10	3.07	95	16.6	0.33	VII.
GR. 1853.....	6	11	59	20	3.08	26	22.1	0.33	XII, VII, (VII), IX,
W. B. XI, 1013..	8	12	0	49	3.07	95	23.4	0.33	VII, (VII).
LL. 22755.....	7	12	1	9	3.07	84	47.3	0.33	A, XII.
A, 617	....	12	2	17	3.07	85	13.4	0.33	A, XII.
W. XI, 1038	8.9	12	2	18	3.07	86	11.7	0.33	A, XII, VI.
W. XII, 6	9	12	2	58	3.07	86	11.8	0.33	A, XII.
P. XII, 3	6.7	12	4	25	3.07	62	1.3	0.33	(VII), XI.
VI, 787	....	12	4	30	3.07	99	40.6	0.33	VI.
VII, 958	....	12	4	54	3.07	91	14.3	0.33	VII.
P. XII, 6	6.7	12	5	16	3.06	85	14.9	0.34	A, XII, IX.
GR. 1858... ...	6	12	5	20	2.84	7	35.7	0.33	IX.
LL. (F.) 2025....	9.8	12	5	52	2.82	7	35.4	0.33	IX.
BR. 1633.....	7.8	12	5	54	2.93	11	51.8	0.33	(VII), IX.
BR. 1634.....	5.4	12	6	19	2.90	11	41.3	0.33	A, XII, VII, (VII), IX.
VII, 961	....	12	6	36	3.06	70	19.8	0.33	VII.
IX, 1124.....	9.10	12	7	6	2.73	6	41.9	0.33	IX.
VII, 962	9	12	8	38	3.07	91	47.4	0.33	VII, (VII).
GR. 1863.....	6.5	12	9	10	+2.92	19	6.2	+0.33	VI, VII, IX.

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P. XII, 29	5	12	10	13	+3.04	56	14.3	+0.33	VII.
W. B. XII, 136..	8.9	12	10	20	3.07	92	2.6	0.33	VII, (VII).
LL. (F.) 2041....	8	12	10	41	2.68	9	10.9	0.33	(VII).
BR. 1642.....	8.9	12	10	45	2.70	9	10.7	0.33	(VII).
LL. 23048	7½	12	12	6	3.06	81	14.3	0.33	VI.
P. XII, 35	7	12	12	7	3.09	98	12.4	0.33	IX.
BR. 1650.....	6.5	12	13	12	2.79	14	8.7	0.33	VII, (VII). IX.
BR. 1656.....	6	12	13	12	1.38	2	52.1	0 33	A, XII, VI.
VI, 795	....	12	13	24	3.06	81	16.8	0.33	VI.
BR. 1649.....	6.7	12	13	43	3.10	111	28.7	0.33	(VII).
GR. 1867.....	7	12	14	0	+3.01	51	24.1	0.33	VI.
BR. 1672.....	6	12	14	18	—0.06	1	36.4	0.33	A, XII, V VII, (VII) IX.
GR. 1879.....	6	12	15	37	+2.20	5	55.9	0.33	IX.
A, 632.....	....	12	16	7	1.15	2	47±	0.33	A, XII.
P. XII, 75.....	6	12	18	53	3.04	65	23.8	0.34	(VII), IX.
GR. 1888.....	6.7	12	19	16	2.84	25	30.3	0.33	IX.
GR. 1892.....	6	12	19	56	1.94	5	52.6	0.33	VI, IX.
VI, 806.....	....	12	21	18	3.03	69	56.7	0.33	VI.
P. XII, 87.....	6	12	21	20	3.11	105	56.3	0.33	VI.
BR. 1669.....	7	12	21	23	2.99	63	23.7	0.33	(VII).
P. XII, 91.....	6.7	12	21	27	3.06	93	55.4	0.33	IX.
W. B. XII, 334.	6.7	12	21	31	3.09	97	59.1	0.33	IX.
B. F. 1726.....	6	12	22	24	3.01	63	4.9	0.33	VI, VII.
BR. 1671.....	6.7	12	22	30	3.01	63	24.4	0.33	(VII).
δ^1 Corvi.....	2 3	12	23	23	3.11	105	49.4	0.33	VII, (VII), IX.
7 δ^2 Corvi....		12	23	24	3.11	105	49.1	0.33	VII, (VII), IX.
P. XII, 111	6.7	12	25	13	+3.07	94	21.8	+0.33	IX.

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P. XII, 118	7	12	27	13	+3.05	81	38.0	+0.33	A, XII, VI.
P. XII, 122.....	6.7	12	27	29	2.95	56	3.6	0.33	(VII), IX.
P. XII, 125.....	7	12	27	59	3.07	90	43.1	0.33	VII, IX.
Oe. A.(N.) 12753	6.7	12	28	4	2.90	42	33.7	0.33	IX.
W. XII, 452	9	12	28	10±	3.05	83	20.6	0.33	A, XII.
Br. 1687.....	7	12	28	50	3.02	70	56.0	0.33	(VII).
W. B. XII, 475..	9	12	29	32	3.07	90	43.5	0.33	VII, (VII).
VII, 993	....	12	29	58	3.02	72	11.3	0.33	VII, (VII).
Gr. 1909.... ...	6	12	30	19	1.97	9	3.6	0.33	IX.
Br. 1693	7	12	30	48	3.03	80	30.9	0.33	(VII).
Ll. 23600	9.10	12	31	7	3.08	92	52.8	0.33	(VII).
P. XII, 142.....	6	12	32	0	3.06	87	27.4	0.33	IX.
(VII), 1503.....	Var.	12	32	10	3.05	82	19.4	0.33	(VII).
P. XII, 143	6.7	12	32	18	3.08	93	41.1	0.33	IX.
P. XII, 147.....	6	12	32	56	3.11	97	20.6	0.33	VII.
29 γ^1 Virginis		12	35	20	3.04	90	45.8	0.33	VI, VII, (VII), IX.
29 γ Virginis.	3.2	12	35	20	3.04	90	45.8	0.33	VI, VII, IX.
29 γ^2 Virginis		12	35	20	3.04	90	45.8	0.33	VI, VII, (VII). IX.
W. B. XII, 603 ..	6	12	38	13	3.08	90	53.4	0.33	VII, IX.
Gr. 1923.....	6	12	37	26	0.88	5	40.2	0.33	(VII), IX.
A, 643.....	....	12	37	35	2.66	28	13.3	0.33	A, XII.
Gr. 1918.....	6.7	12	37	35	2.67	28	9.6	0.33	XII, VI.
W. B. XII, 619..	7	12	37	46	3.08	92	9.5	0.33	VI, VII.
Ll. (F.) 2138.....	9	12	38	30±	2.66	28	13.3	0.33	VI.
Gr. 1919	6	12	38	33	2.85	45	12.8	0.33	p. cxviii. XII.
Gr. 1922.....	5.6	12	39	15	2.84	43	52.6	0.33	A, XII.
P. XII, 183.....	6.7	12	41	6	3.09	95	37.0	0.33	IX.
Gr. 1927.....	6	12	41	16	+1.51	8	41.6	+0.33	IX.

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Gr.1926.....	6	12	41	58	+2.59	26	32.2	+0.33	IX.
W.B.XII,706..	9	13	42	34	3.01	75	16.8	0.33	VI.
A, 647.....	7	12	43	4	2,60	28	29.9	0.33	A, XII.
Gr.1930.....	6.7	12	43	13	2.62	28	59.9	0.33	IX.
P.XII,193.....	7	12	43	39	3.19	96	57.1	0.33	VII.
Gr.1931.....	6	12	44	14	2.87	51	48.2	0.33	XII, IX.
W.B.XII,747..	Var	12	44	45	3.04	83	46.1	0.33	VII.
P.XII,196.....	6.7	12	44	53	3.11	99	39.4	0.33	IX.
VI,828.....	....	12	47	23	3.07	88	57.8	0.33	VI.
Br. 1730.....	5.6	12	48	6	0.37	5	54.2	0.33	A, XII, IV, (VII), IX.
Br. 1731.....	5.6	12	48	14	0.35	5	54.5	0.33	A, XII, VI, (VII), IX.
12 Canum Ven.. (1st star).	7	12	50	9	2.82	51	0.7	0.33	A XII, VI VII (VII) IX.
12 Canum Ven.. (2d star).	8	12	50	11	2.82	51	0.4	0.33	A, XII, VI, VII, (VII).
Br. 1726.....	6	12	50	49	2.64	35	13.4	0.33	(VII).
VII,1021.....	....	12	51	24	3.12	98	58.0	0.33	VII.
XII,1038.....	....	12	51	58	2.27	20	42.5	0.33	XII.
W.B.XII,880..	8	12	52	39	3.12	99	10.1	0.33	VII, (VII).
XII,1039.....	7	12	53	32	2.25	20	37.2	0.33	XII.
P.XII,238	6	12	53	42	3.27	122	49.7	0.33	VI.
Gr.1947.... ...	8	12	54	22	2.23	20	33.2	0.33	XII.
P.XII,255.....	6	12	56	54	2.38	25	43.1	0.32	IX.
P.XII,253.....	7	12	57	6	2.92	65	30.1	0.32	IX.
XII,1043.....	8	12	57	20±	1.98	16	50.5	0.32	XII.
VII,1031.....	....	12	58	58	3.13	99	26.6	0.32	VII.
XII,1045.....	7.8	13	0	4	1.94	16	55.5	0.32	XII.
Gr.1957...	8	13	0	28	2.68	41	18.1	0.32	VII.
Gr.1960.....	7	13	0	53	1.87	16	18.3	0.32	XII.
P.XII,278	6	13	1	26	2.41	27	17.3	0.33	IX.
Br. 1745	6	13	1	55	+2.88	61	46.4	+0.32	(VII).

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B. F. 1805	6	13	2	2	+3.12	98	18.8	+0.32	VII, IX.
P. XII, 283.....	6.7	13	3	39	2.96	72	29.1	0.32	(VII), IX.
Gr. 1961.....	6.7	13	3	53	2.78	51	54.7	0.32	XII, IX.
VII, 1041.....	....	13	4	49	3.14	99	50.9	0.32	VII.
P. XIII, 16.....	6	13	6	20	2.99	77	46.7	0.32	VII.
54 Virginis (1st star)	6.7	13	6	46	3.21	108	9.7	0.32	(VII).
54 Virginis (2d star)		13	6	46	3.21	108	9.6	0.32	(VII).
P. XIII, 27.....	5	13	8	3	+2.73	49	11.1	0.32	A, XII, VII.
Gr. 2006	7	13	8	29	−10.26	1	40.8	0.32	VI, VII.
W. XIII, 113...	8	13	8	59	+3.12	97	23.7	0.32	A, XII.
P. XIII, 30.....	7	13	9	12	3.05	86	17.2	0.32	VII.
Ll. 24610... ...	7.8	13	9	35	3.11	95	0.4	0.32	VI, VII.
P. XIII, 31	5.4	13	9	57	3.32	120	50.6	0.32	VI, VII.
W. B. XIII, 154.	6	13	10	54	3.18	104	53.2	0.32	VII.
P. XIII, 41.....	6	13	11	5	2.97	75	39.9	0.32	(VII), IX.
Gr. 1977.....	6	13	11	21	0.45	8	52.1	0.32	XII, VI.
Lac. 5503	7	13	14	50±	3.36	125	27.4	0.32	A, XII.
B. F. 1843	6	13	15	13	2.96	75	11.7	0.32	VII.
Or. A. (N.) 13558	6.7	13	15	44	2.59	42	4.5	0.32	IX.
P. XIII, 67.....	7	13	16	2	3.12	95	32.6	0.32	VII.
Gr. 1986.....	6	13	18	14	2.73	52	18.8	0.32	IX.
79 ζ^1 Urs. Maj.	2	13	18	53	2.43	34	25.2	0.31	A, XII, VII, (VII), IX.
ζ^2 Urs. Maj...		13	18	54	+2.43	34	25.4	0.31	A, XII, VII, (VII), IX.
Gr. 2007.....	6	13	19	45	−2.61	4	35.5	0.31	XII. VI. VII (VII). IX.
V Virginis	Var	13	21	21	+3.09	92	31.4	0.31	(VII), IX.
P. XIII, 96.....	6	13	21	43	2.06	26	5.8	0.31	IX.
R Hydrae	Var	13	22	53	3.27	112	38.0	0.31	VII, (VII), IX.
P. XIII, 109 ...	6	13	22	57	+1.52	16	57.5	+0.31	VII, (VII), IX.

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A, 673.....	8.9	13 23 22	+2.45	37 28.4	+0.31	A, XII.
W. B. XIII, 364	7	13 23 41	3.02	83 20.5	0.31	VI, VII.
P. XIII, 110	5.6	13 23 52	2.23	29 24.4	0.31	XII, IX.
W. XIII, 375...	8	13 24 22	3.13	97 12.9	0.31	A, XII.
W. B.(2)XIII,465	8.9	13 24 52	2.85	65 7.2	0.31	(VII), IX.
B. F. 1857.....	6	13 24 57	2.85	65 7.0	0.31	(VII), IX.
P. XIII, 114 ...	7	13 25 21	3.04	91 40.9	0.31	VII.
P. XIII, 112....	6	13 25 36	3.33	118 55.2	0.31	VII, (VII), IX.
GR. 2008.....	6	13 25 50	2.62	47 15.1	0.31	A, XII.
P. XII, 133	6	13 25 54	0.45	10 42.6	0.31	VII, (VII), IX.
VII, 1080	Var	13 26 28	3.13	96 33.0	0.31	VII, (VII).
W. XIII, 438 ...	7.8	13 27 45	3.14	97 58.0	0.31	A, XII.
P. XIII, 126	6.7	13 28 2	3.19	102 34.3	0.31	VII, IX.
P. XIII, 136...	6	13 29 13	2.69	52 10.6	0.31	XII, VI, VII, IX.
P. XIII, 140	8	13 29 40±	2.70	52 58.5	0.31	(VII).
OE. A. (N.) 13800	8	13 30 47	2.38	36 37.6	0.31	IX.
81 Virginis..... (1st star).	7	13 31 2	3.14	97 14.0	0.31	VII.
81 Virginis..... (2nd star).	7	13 31 3	3.14	97 14.0	0.31	VII.
P. XIII, 145....	7	13 31 19	3.09	92 35.8	0.31	VII.
BR. 1794.....	7.8	13 31 38	2.37	36 40.4	0.31	IX.
P. XIII, 146 ...	6	13 31 41	3.34	118 55.2	0.31	VII, (VII).
P. XIII, 152....	7	13 32 40	3.19	101 27.2	0.31	VII.
GR. 2023	8.9	13 32 40	2.48	41 18.9	0.31	VII.
W. B. XIII, 557.	6	13 33 25	2.97	78 37.1	0.31	VII.
GR. 2029.....	6	13 34 11	1.44	18 7.3	0.31	IX.
P. XIII, 158....	7	13 34 20	3.19	102 8.9	0.31	VII.
{ B. F. 1875. } { P. XIII, 161. }	7½	13 34 43	2.87	69 21.3	0.31	A, XII.
W. XIII, 597 ...	8	13 35 59	+3.05	88 22.4	+0.31	A, XII, VI.

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P. XIII, 174....	6	13	37	24	+3.11	94	52.1	+0.31	IX.
W. XIII, 627 ...	8.9	13	37	25	2.99	81	53.5	0.31	XII.
P. XIII, 184. ..	6	13	37	36	1.87	24	32.9	0.31	A, XII, IX.
B. F. 1883.....	6	13	37	51	2.83	66	40.1	0.30	VII, (VII).
P. XIII, 179....	7	13	38	24	3.14	97	0.4	0.31	VII.
XII, 1089	....	13	38	40	2.98	81	0.1	0.30	XII.
Ll. 25360	8½	13	39	3	2.98	80	31.8	0.30	XII, VI.
W. XIII 670 ...	8	13	39	50	3.01	84	15.3	0.30	XII, VI.
B. F. 1886	6	13	40	37	3.16	99	4.8	0.30	A, XII, IX.
P. XIII, 194....	7	13	40	47	3.00	83	1.1	0.30	XII, VI.
P. XIII, 192....	7	13	40	54	3.14	96	4.7	0.30	VII.
Gr. 2044.....	6.5	13	40	55	2.56	48	16.9	0.30	A, XII.
XII, 1098	....	13	41	34	3.16	99	4±	0.30	XII.
Gr. 2053	6	13	42	8	0.17	11	18.6	0.30	XII. VI. VII,(VII) IX.
W. B. XIII, 720	8.9	13	42	49	2.96	79	18.1	0.30	XII, VI, VII, (VII).
B. F. 1901. ...	6	13	44	8	2.87	70	44.9	0.30	VII.
XII, 1104	9	13	44	20±	2.38	39	58.5	0.30	XII.
3 Centauri ... (1st star).	4.5	13	44	37	3.44	122	22.3	0.30	VII, IX.
3 Centauri ... (2d star).		13	44	38	3.44	122	22.4	0.30	VII, IX.
Lac. 5712.....	6	13	44	50±	3.43	121	0.2	0.30	A, XII.
B. F. 1905	5	13	45	38	2.65	54	42.8	0.30	IX.
Gr. 2055.....	6.5	13	45	41	+1.95	27	53.2	0.30	IX.
P. XIII, 263....	6	13	46	0	—2.09	6	37.2	0.30	VII, (VII), IX.
B. F. 1907	6	13	46	17	+2.65	54	56.2	0.30	(VII).
P. XIII, 228....	7.8	13	46	32	2.90	72	39.1	0.30	VII, (VII), IX.
Ll. 25569	8	13	47	53	3.10	92	23.2	0.30	VI.
Br. 1820 ..... (1st star).	6	13	48	25	3.15	97	26.6	0.30	IX.
Br. 1820..... (2d star).		13	48	25	+3.15	97	26.5	+0.30	IX.

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W. XIII, 826....	7	13	49	16	+3.17	99	8.6	+0.30	A, XII.
W. XIII, 838....	8	13	50	1	+3.17	99	25.3	0.30	A, XII.
Gr. 2066.....	6	13	50	29	−0.31	10	23.3	0.30	VII, (VII), IX.
P. XIII, 264.....	6	13	52	38	+2.90	74	44.4	0.30	(VII), IX.
W. XIII. 909...	8.9	13	54	14	3.09	91	30±	0.29	XII.
W. XIII, 914 ...	9	13	54	21	3.08	91	11±	0.29	XII.
A, 704	....	13	54	50±	3.08	91	19.7	0.29	A, XII.
XII, 1117	....	13	55	33	2.88	73	21.4	0.29	XII.
P. XIII, 280	7.8	13	55	40	2.87	72	38.2	0.29	XII.
Lac. 5791.....	6	13	55	46	3.45	121	4.8	0.29	XII, VI.
Ll. 25818.....	6	13	57	24	2.94	78	36.0	0.29	(VII.)
P. XIII, 286.....	6.7	13	57	38	3.24	104	22.2	0.29	IX.
B. F. 1932... / P. XIII, 296.	7	13	58	21	2.26	38	25.5	0.29	A, XII.
A, 707.....	....	13	59	0±	3.54	125	47.1	0.29	A, XII.
P. XIII, 306.....	6	13	59	6	1.33	20	43.1	0.29	XII. VI. VII, (VII), IX.
Ll. 25892.....	7	14	0	12	2.98	82	23.8	0.29	(VII.)
P. XIII, 300	7	14	0	26	3.25	105	35.7	0.30	VII.
VI, 884	....	14	0	32	2.83	70	32.2	0.29	VI.
XII, 1124	....	14	1	32	+2.75	64	18.7	0.29	XII.
Gr. 2099	7.8	14	2	29	−7.69	3	38.6	0.29	VII, (VII), IX.
Ll. 25943.....	7	14	2	32	+2.76	65	5.5	0.29	(VII.)
P. XIII, 316	6.5	14	2	56	2.41	45	33.0	0.29	(VII), IX.
Ll. 25951.....	8½	14	3	2	2.82	69	56.5	0.29	XII.
Oe. A. (N.)14328	8.9	14	3	56	0.47	14	50.1	0.29	IX.
P. XIII, 317	6	14	4	1	3.26	105	42.6	0.29	VII, (VII), IX.
XII, 1128	....	14	4	12	2.83	70	36.8	0.29	XII.
VII, 1132	5.6	14	4	34	+3.10	92	44.4	+0.29	VII (VII.)

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W. B. XIV, 51..	6	14	5	11	+3.05	88	3.1	+0.29	VII.
P. XIV, 12	5.4	14	5	56	3.03	87	0.2	0.29	VII, (VII).
Br. 1840.....	6.5	14	6	5	3.41	116	1.7	0.29	A, XII.
A, 711.....	....	14	7	22	3.11	93	43.3	0.29	A, XII.
Lac. 5869.....	6.5	14	7	47	3.44	118	41.7	0.28	VII, (VII), IX.
Br. 1843.... ...	6½	14	7	51	3.12	95	21.9	0.28	VI.
P. XIV, 22.....	6	14	8	31	3.30	107	36.9	0.28	VII, IX.
P. XIV, 26.....	7	14	8	54	2.78	67	32.4	0.28	XII.
κ^1 Bootis.....	8	14	9	0	2.17	37	37.5	0.28	A, XII.
17 κ^2 Bootis	4.5	14	9	0	2.15	37	37.4	0.28	A, XII.
W. XIV, 127....	9	14	9	14	3.20	100	37.2	0.28	A, XII.
Gr. 2089.....	6	14	9	21	2.43	47	53.5	0.28	IX.
Gr. 2091.....	6.5	14	9	45	1.11	19	58.8	0.28	A. XII. VI VII. (VII), IX.
Br. 1848.....	6	14	10	12	2.82	70	30.3	0.28	(VII).
Ll. 26144... ...	9	14	10	50	2.76	66	44.5	0.28	XII.
B. F. 1962	6	14	10	54	2.11	36	52.9	0.28	A, XII.
Ll. 26150.. ..	6.7	14	11	44	3.31	108	8.1	0.28	IX.
21 Bootis ..... (1st star.)	4.5	14	11	44	2.13	38	3.3	0.28	VI.
21 Bootis ..... (2nd star)	....	14	11	47	2.14	38	2.8	0.28	VI.
Br. 1856	6	14	12	54	2.14	38	6.9	0.28	(VII), IX.
XII, 1148	....	14	13	58	2.74	65	55.3	0.28	XII.
B. F. 1967	6½	14	14	8	2.11	37	23.4	0.28	A, XII.
Ll. 26260	9	14	14	24	2.03	35	29.0	0.28	A, XII.
Gr. 2100.....	6	14	14	40	2.46	50	37.9	0.28	(VII).
XII, 1152	....	14	17	18	2.73	65	19.5	0.28	XII.
XII, 1153	....	14	17	20±	+2.72	65	17.5	+0.28	XII.

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Gr. 2105.....	7	14 17 28	+1.17	21 38.7	+0.28	IX.
P. XIV, 68	6	14 17 41	3.41	114 14.4	0.28	A, XII.
VII, 1146.....	....	14 17 48	2.96	81 24.3	0.28	VII.
Br. 1861	7½	14 17 58	3.21	101 6.2	0.28	A, XII.
VI, 897.....	....	14 18 30	3.32	108 37.4	0.28	VI.
Gr. 2108.....	7	14 18 43	1.15	21 37.6	0.27	IX.
VI, 898.....	....	14 18 50	3.33	108 57.4	0.28	VI.
XII, 1156.....	....	14 18 50	2.71	64 41.6	0.28	XII.
B. F. 1980.....	6.7	14 20 23	2.45	51 2.5	0.27	VII, (VII).
B. F. 1983.....	6	14 23 6	2.49	58 14.6	0.27	IX.
P. XIV, 103	6.7	14 24 28	2.58	57 39.1	0.28	IX.
W. XIV, 424 ...	8	14 24 34	3.23	101 18.7	0.27	A, XII.
XII, 1159.....	....	14 24 38	2.67	63 3.3	0.29	XII, VI.
Gr. 2116... ...	6	14 24 41	2.35	47 38.2	0.27	VII, (VII).
XII, 1160... ...	....	14 25 45	2.67	63 2.1	0.27	XII.
Ll. 26560	8	14 26 55	2.60	59 11.8	0.27	XII, VI, VII
XII, 1164.....	....	14 27 28	2.65	62 24.0	0.27	XII, VI.
Gr. 2123.....	6	14 27 49	1.44	26 15.8	0.27	XII, VI, IX.
XII, 1166.....	....	14 28 30	2.62	60 35.9	0.27	XII.
VI, 907.....	...	14 28 50	1.42	26 7.5	0.27	VI, VII.
Gr. 2127.....	6½	14 29 32	2.19	42 40.0	0.27	A, XII.
P. XIV, 128...	6.7	14 29 32	2.47	52 49.4	0.27	IX.
VI, 908....	....	14 29 50±	1.41	26 7.6	0.27	VI.
Oe. A. 14703...	9	14 30 40	1.40	26 9.1	0.26	VI, VII.
Gr. 2132.....	6	14 30 58	1.24	24 3.4	0.26	VII, IX.
Gr. 2134.....	...	14 31 35	+1.40	26 14.1	+0.26	VII.

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VII, 1159.....	Var	14	31	41	+2.65	62	43.1	+0.26	VII, (VII),
Ll. 26696.....	6	14	32	25	2.79	71	9.4	0.26	(VII).
XII, 1170.....	....	14	33	0	2.6	60	31.6	0.26	XII.
Gr. 2135.....	5	14	33	31	2.27	45	49.1	0.26	A,XII,(VII)
P. XIV, 145.	6	14	34	44	2.87	75	55.7	0.26	XII, VI, (VII).
29 π Bootis (1st star).....	4	14	34	51	2.82	73	2.7	0.26	VI.
29 Bootis (2nd star).....	4	14	34	52	2.82	73	2 7	0.26	VI.
P. XIV, 150.....	5	14	36	1	3.64	124	38.0	0.26	VII, (VII), IX.
Ll. 26816.....	7	14	36	42	2.73	68	10.3	0.26	(VII).
Ll. 26865	9.10	14	37	18	1.94	36	49.1	0.26	VI, VII.
XII, 1177.....	....	14	37	54	2.58	59	46.0	0.26	XII.
VI, 917....	....	14	38	36	2.79	71	40.9	0.26	VI.
54 Hydrae (1st star).....	6	14	38	47	3.46	114	54.6	0.26	XII.
54 Hydrae (2nd star)	....	14	38	40±	3.46	114	54.8	0.26	XII.
B. F. 2017.. Gr. 2145...	6	14	38	55	2.33	49	0.7	0.26	XII.
Gr. 2146.....	6	14	38	56	1.48	28	12.3	0.26	IX.
P. XIV, 166....	7	14	39	6	3.38	110	37.7	0.26	A, XII.
ε^1 Bootis	....	14	39	32	2.62	62	23.9	0.26	A,XII, VII.
36 ε^2 Bootis.....	2.3	14	39	32	2.62	62	24.0	0.26	A,XII,VII.
P. XIV, 171	7	14	40	7	3.38	110	48.0	0.26	A, XII.
Lac. 6111.....	6.7	14	42	6	3.45	113	44.4	0.25	IX.
Ll. 26975.....	6	14	42	29	3.08	90	19.6	0.25.	(VII).
Ruemker, 4824.	....	14	43	40	2.53	58	14.3	0.25	XII, VI.
VI, 929.....	....	14	44	0±	2.53	58	14.9	0.25	VI.
Br. 1895.....	6	14	44	36	3.34	107	16.2	0.26	VII, IX.
P. XIV, 193....	6	14	44	36	2.59	60	52.0	0.25	A, XII, IX.
Oe. A. 14881...	7.8	14	44	43	+1.41	27	54.9	+0.25	XII, VI.

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39 Bootis..... (1st star.)	6	14 45 26	+2.04	40 45.9	+0.25	XII, VI.
39 Bootis..... (2d star.)	6	14 45 26	2.04	40 46±	0.25	XII, VI.
GR.2154.....	6	14 45 34	2.39	52 12.9	0.25	(VII), IX.
W.B.XIV, 844 .	8	14 45 36	2.85	76 1.1	0.29	VI.
37 ξ Bootis ..... (1st star).	4	14 45 37	2.77	70 22.6	0.25	VI.
37 ξ Bootis ..... (2d star).	4	14 45 38	2.77	70 22.7	0.25	VI.
OE.A.14909	9	14 46 48	1.36	27 26.6	0.25	VII, (VII).
VI, 936.....	...	14 46 49	1.36	27 33±	0.25	VI.
VI, 937.....	....	14 46 50	1.36	27 33±	0.25	VI.
LL.27139.....	8	14 47 32	2.52	58 16.9	0.25	XII.
P.XIV, 204.....	5.6	14 48 5	3.65	123 20.9	0.25	VII, (VII, IX.
P.XIV, 217.....	6	14 48 16	1.51	30 11.9	0.25	A, XII, VI, VII.
LL.27221.....	8	14 50 10	2.48	56 40.2	0 25	XII.
P.XIV, 212.....	6	14 50 10	3.48	110 51.2	0.28	A, XII, VII, IX.
VI, 940.....	....	14 50 23	3.27	102 25.3	0.25	VI.
W.B.XIV, 941 .	9	14 50 58	3.09	90 55.6	0.25	IX.
P.XIV, 226.....	6	14 51 22	2.80	73 6.4	0.24	A, XII, (VII) IX.
XII, 1206.....	....	14 52 3	2.45	55 58±	0.25	XII.
VI, 941.....	....	14 52 3	2.45	55 49.6	0.25	VI.
{ B.F.2049... P.XIV, 235. }	6	14 52 15	2.01	39 51.9	0.26	A, XII.
XII, 1209.....	....	14 52 43	2.45	55 56.3	0.24	XII, VI.
VI, 943.....	6	14 52 49	3.23	99 44.4	0.24	VI, VII, (VII).
VI, 945.....	....	14 52 50±	2.45	55 57.3	0.24	VI.
VI, 946.....	....	14 52 50±	2.45	55 57.7	0.24	VI.
B.F.2051.....	6	14 54 38	2.29	49 51.4	0.24	(VII).
P.XIV, 260.....	5	14 55 36	0.94	23 34.1	0.24	VII, IX.
P.XIV, 245.....	7	14 55 50	3.18	97 20.7	0.24	A, XII.
P. XIV, 246....	7	14 56 5	+3.38	107 8.8	+0.24	VII.

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{B. F. 2058.. / P. XIV, 263}	6	14 58 7	+2.40	54 18.3	+0.24	XII.
LL. 27463.....	8	14 58 20	2.44	55 56.4	0.24	XII.
BR. 1931.....	6.7	14 58 27	2.58	62 25.7	0.24	(VII.)
{B. F. 2060.. / LL. 27490...}	5½	14 58 42	2.13	44 52.0	0.24	A, XII.
P. XIV, 262.....	7	14 58 57	+3.47	112 50.2	0.24	A, XII.
GR. 2196.....	5	14 59 8	−4.62	6 58.6	0.24	VII, (VII), IX.
W. B. XIV, 1093	9	14 59 21	+3.22	99 3.1	0.24	VI.
44 i^1 Bootis.....	5	14 59 40	1.97	41 51.6	0.24	A, XII, VII.
i^3 Bootis.....	6	14 59 40	1.97	41 51.6	0.24	A, XII, VII.
GR. 2192.....	6	15 2 4	0.89	23 35.6	0.23	VII, (VII).
P. XIV, 282.....	6	15 2 34	3.49	113 30.3	0.23	VII, IX.
LL. 27633	8	15 3 9	2.18	47 7.8	0.23	(VII.)
P. XIV, 291	6	15 3 9	2.62	64 24.6	0.23	A, XII.
OE. A. 15129....	8.9	15 3 35	+2.03	42 38.0	0.23	(VII.)
GR. 2213.....	6	15 4 28	−6.82	5 33.9	0.23	IX.
W. B. XV, 45...	9	15 4 55	+3.24	100 2.0	0.23	VI.
VI, 954.....	....	15 5 6	3.24	99 52.6	0.23	VI.
B. F. 2065.....	7	15 5 6	3.40	108 37.9	0.23	VII.
LL. 27668.....	7	15 5 59	3.48	113 32.2	0.23	(VII.)
LL. 27718.....	6.7	15 6 23	2.73	70 33.1	0.23	(VII.)
W. B. XV, 74...	9	15 6 28	3.24	99 51.2	0.23	VI, VII. (VII.)
VII, 1209.....	....	15 6 30±	3.24	99 53.2	0.23	VII.
VI, 956.....	....	15 6 49	0.98	24 58.8	0.23	VI.
LL. 27757.....	7½	15 7 9	2.33	52 46.5	0.23	XII.
GR. 2198.....	8	15 7 23	1.94	40 50.1	0.23	A, XII, VI, VII.
P. XV, 14.....	7	15 7 24	3.38	107 57.5	0.23	VII.
GR. 2202.....	7	15 8 41	1.94	40 57.1	0.23	A, XII, VI, VII.
GR. 2201.....	6	15 8 50	+2.29	51 16.0	+0.23	(VII.)

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P. XV, 19.....	6	15	9	8	+3.46	111	56.1	+0.23	VII, IX.
OE. A. 15221....	7	15	9	33	1.04	25	54.7	0.23	VI.
GR. 2206.....	6	15	9	39	2.17	47	21.8	0.23	A, XII.
OE. A. 15222....	7	15	9	42	1.04	25	52.9	0.23	VI.
LL. 27853.....	8	15	10	13	2.32	52	42.5	0.23	XII.
LL. 27904.....	7	15	11	36	2.31	52	28.1	0.22	XII, VI, (VII).
LL. 27885.....	7	15	12	1	3.05	88	36.0	0.22	(VII).
P. XV, 36.....	6	15	12	48	2.69	68	58.1	0.22	A, XII, VII
VI, 965.....	....	15	12	54	2.30	52	22.6	0.22	VI, VII, (VII).
VII, 1219.....	...	15	13	0±	2.31	52	28.1	0.22	VII.
GR. 2214.....	5.6	15	13	13	0.66	22	10.7	0.22	XII, VI, VII (VII), IX.
W. B. XV, 210..	9	15	13	27	3.31	103	30.7	0.22	VII, (VII).
XII, 1240.....	....	15	13	52	2.29	52	7.9	0.22	XII, VI.
LL. 27993.....	9	15	14	24	2.29	52	3.5	0.22	XII.
P. XV, 56.....	7½	15	15	34	1.86	39	19.9	0.22	A, XII, VI.
S Serpentis.....	Var	15	15	49	2.81	75	14.2	0.22	IX.
LAC. 6360.....	7	15	16	33	3.58	116	51.4	0.22	(VII).
P. XV, 54.....	6	15	17	1	3.28	101	55.3	0.22	(VII).
GR. 2223.....	7½	15	17	50	+1.73	37	12.5	0.22	A, XII.
GR. 2283.....	6	15	18	16	−22.37	2	17.4	0.21	VI, VII, (VII), IX.
LL. {28148 / 28149} ...	8	15	19	38	+2.25	51	22.0	0.22	XII.
51 μ^1 Bootis	4.3	15	19	46	2.27	52	10.9	0.21	XII, VI.
μ^2 Bootis.....	8	15	19	48	2.28	52	13.9	0.22	XII, VI.
VI, 971.....	....	15	19	51	3.47	111	26.2	0.22	VI.
GR 2230.....	7	15	21	5	1.95	42	29.8	0.21	A, XII.
VI, 974.....	....	15	21	11	3.48	111	42±	0.22	VI.
B. A. C. 5099...	7	15	23	7	3.38	106	49.4	0.21	A, XII, VI, VII.
GR. 2237.....	6.7	15	23	52	2.23	50	50.6	0.21	XII.
P. XV, 91.....	7	15	24	32	+3.44	109	44.2	+0.21	VII.

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P.XV, 110.....	6	15	25	20±	+0.99	27	17.5	+0.21	IX.
Gr. 2241.....	6	15	25	23	1.18	28	53.8	0.21	IX.
P. XV, 96	6	15	25	26	3.43	109	14.6	0.21	VII, IX.
Lac. 6425.....	7	15	26	30	3.56	114	41.1	0.21	VII, IX.
Ll. {28365... / 28366...}	7½	15	27	10	2.19	49	54.0	0.21	XII.
Br. 1963.....	6.7	15	27	19	2.77	73	33.9	0.21	(VII).
13 δ^1 Serpentis..	3.4	15	28	56	2.87	79	2.6	0.21	VI.
13 δ^2 Serpentis..	3.4	15	28	56	2.87	79	2.6	0.21	VI.
P. XV, 136.....	6	15	29	10±	0.86	25	22.2	0.20	IX.
P. XV, 118.....	7	15	29	59	3.58	115	52.0	0.21	A, XII.
Gr. 2253.....	6	15	30	53	2.06	46	25.0	0.20	(VII).
IX, 1394.....	7	15	31	1	3.47	110	36.1	0.20	IX.
Gr. 2254.....	7	15	31	30	1.79	39	53.1	0.20	A, XII.
XII, 1278	...	15	33	57	2.18	50	22.5	0.20	XII.
Gr. 2258...	7	15	34	8	2.03	45	59.3	0.20	A, XII.
W. B. XV, 637.	9	15	34	39	3.36	105	9.3	0.20	VI, VII.
7 ζ Coronae... (1st star.)	4	15	34	40	2.27	52	57.4	0.20	VII, IX.
7 ζ Coronae... (2nd star.)		15	34	40	2.27	52	57.4	0.20	VII, IX.
W. B.XV, 644..	9	15	35	0	3.36	105	9.8	0.20	VI, VII, (VII).
P. XV, 150.....	7	15	35	44	3.35	105	36.7	0.20	VI.
Br. 1987.....	7	15	36	24	3.35	104	38.5	0.20	A, XII, VI.
Ll. 28665.....	8	15	36	30	+2.12	48	39.8	0.20	XII.
Gr. 2275.....	6	15	36	32	−3.73	9	8.3	0.19	IX.
Gr. 2276.....	6	15	36	44	−3.72	9	8.3	0.19	IX.
Ll. 28670.....	6	15	38	24	+3.56	114	19.1	0.19	VII, IX.
Gr. 2279.....	6	15	39	27	+1.63	37	14.6	0.19	A, XII, IX.
Gr. 2286.....	7	15	40	22	−5.46	7	19.5	0.19	IX.
XII, 1289.....	....	15	41	26	+3.69	119	37±	0.19	A, XII.
VII, 1255.... ..	...	15	41	30	+3.70	119	49.4	0.19	VII.
XII, 1292.....	....	15	42	43	+2.07	47	53.6	+0.19	XII.

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VII, 1253.....	Var	15	43	26	+2.49	61	27.5	+0.19	VII, (VII).
LAC. 6562.....	6	15	44	31	3.70	119	30.3	0.19	A, XII, VI,
W. B. XV, 838.	8	15	44	37	3.35	104	29.2	0.19	VI.
P. XV, 198.....	5	15	44	46	0.92	27	0.9	0.19	XII, IX.
(VII), 1778.....	Var	15	44	56	2.76	74	29.2	0.19	(VII).
A^1 Scorpii	....	15	46	6	3.59	114	57±	0.19	VII.
2 A^2 Scorpii....	5	15	46	7	3.59	114	57.1	0.19	VII.
W. B. XV, 864.	8	15	46	21	3.53	104	20.5	0.19	VI.
BR. 2009	6	15	46	26	3.57	114	9.7	0.19	A, XII, VI.
P. XV, 192.....	6	15	46	30	3.56	113	36.1	0.18	VI, IX.
VII, 1265.....	Var	15	46	32	3.39	105	51.7	0.18	VII.
VII, 1268.....	....	15	47	49	3.69	118	49.0	0.18	VII.
GR. 2285.....	7	15	47	54	1.57	36	43.0	0.18	A, XII.
OE. A. 15022....	8.9	15	48	26	3.45	108	25.4	0.18	(VII).
OE. A. 15028....	8	15	48	46	3.66	117	41.1	0.18	(VII), IX.
ξ^1 Lupi.....	4.5	15	48	54	3.32	123	35.9	0.18	VII, (VII),
ξ^2 Lupi.....	6.7	15	48	55	3.79	123	35.8	0.18	VII, (VII).
B. F. 2177.. / P. XV, 212..	6	15	49	4	2.64	69	19.2	0.18	A, XII, IX.
W. B. XV, 910..	6	15	49	14	3.35	104	1.7	0.18	VI, VII,
GR. 2288.....	6	15	49	22	1.40	33	48.2	0.18	A, XII, VI.
LL. 28997.....	6	15	50	1	3.39	105	40.1	0.18	(VII).
VI, 1010.....	....	15	50	2	3.35	104	1.0	0.18	VI, VII.
OE. A. 15067...	8	15	50	51	3.41	106	43.4	0.18	(VII).
W. B. XV, 942.	9	15	50	53	3.35	103	58.2	0.20	VI.
(VII), 1797.....	....	15	52	8	3.29	105	51.8	0.18	(VII).
LL. 29100.....	7	15	53	7	2.73	73	25.8	0.18	(VII).
(VII), 1802.....	9	15	53	14	2.51	63	42.0	0.18	(VII.)
T Coronæ	Var	15	54	16	2.51	63	43.4	0.17	(VII), IX.
P. XV, 239.....	6	15	54	21	+2.23	53	0.0	+0.17	(VII).

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(VII), 1806.....	9.10	15	55	2	+2.51	63	54.8	+0.17	(VII.)
(VII), 1807.....	9.10	15	55	3	2.51	63	55.4	0.17	(VII.)
P. XV, 237.....	6	15	55	48	3.61	115	30.8	0.17	IX.
Ll. 29156.....	7.8	15	55	51	3.48	109	29.4	0.17	A, XII, IX.
(VII), 1809.....	7.8	15	55	52	+2.50	63	28.7	0.18	(VII.)
Gr. 2315.....	6	15	56	32	−6.73	6	40.7	0.17	XII, VI.
W. B. XV, 1062.	8	15	57	30	+3.30	101	1.5	0.17	IX.
8 β^1 Scorpii.....	2	15	58	10	3.47	109	27.7	0.17	A, XII, VI, VII.
β^2 Scorpii.....	5.6	15	58	10	3.47	109	27.5	0.17	A, XII, VI, VII.
Ll. 29261.....	7	15	58	11	2.94	83	38.6	0.17	(VII),
P. XV, 266.....	6	15	58	44	2.22	53	1.3	0.17	(VII), IX.
W. XV, 1100....	9	15	59	11	3.31	101	57.7	0.17	XII, VI.
W. XV, 1103....	9	15	59	28	3.31	101	58±	0.17	XII.
W. XV, 1120....	9	16	0	0±	3.31	101	57.8	0.17	A, XII.
W. B. XV, 1118.	7	16	0	6	3.35	103	44.0	0.17	VI.
P. XV, 265.....	6.5	16	0	31	3.65	115	59.4	0.17	VII, IX.
(VII), 1818.....	Var	16	0	36	2.68	71	17.5	0.17	(VII).
(VII), 1819.....	9	16	1	12	2.68	71	19.4	0.17	(VII).
W. B. XV, 1144.	8	16	1	13	3.35	103	36.1	0.17	VI.
Lac. 6710.....	6.7	16	1	16	3.57	113	21.0	0.17	IX.
VII, 1292.....	....	16	2	6	+3.40	105	47.3	0.17	VII.
Ll. (F.) 2774....	....	16	2	26	−12.27	4	20.5	0.16	VII.
Br. 2050.....	7	16	2	26	+2.70	72	36.7	0.17	(VII), IX.
Br. 2048.....	7	16	2	35	2.89	81	3.2	0.17	(VII).
P. XV, 280.....	6	16	3	16	3.71	119	5.2	0.17	A, XII.
W. B. XVI, 38..	7.8	16	4	4	3.35	103	39.6	0.16	VI.
14 ν^1 Scorpii...	7	16	4	43	3.48	109	7.3	0.16	A, XII, VI, IX.
14 ν^2 Scorpii....	4	16	4	44	+3.47	109	8.0	+0.16	A, XII, VI.

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LL. 29490	9	16	5	21	+3.35	103	24.8	+0.16	VI, VII.
VI, 1031	....	16	5	31	3.35	103	22.9	0.16	VI, VII.
GR. 2320.....	6.5	16	5	59	0.14	21	51.6	0.16	XII, VI, VII,(VII) IX.
P. XVI, 10.....	6	16	6	20	3.52	111	4.7	0.16	VII, IX.
VII, 1302	....	16	6	33	3.58	113	27.2	0.16	VII.
P. XVI, 25.....	6	16	7	14	3.21	53	15.1	0.16	IX.
49 Serpentis .. (1st star).	7	16	7	29	2.80	76	8.2	0.16	(VII.)
49 Serpentis.. (2d star).		16	7	29	2.80	76	8.3	0.16	(VII.)
P. XVI, 33.....	7.8	16	8	53	1.84	43	47.3	0.16	XII, VI.
P. XVI, 28.....	7	16	9	41	3.49	109	47.6	0.16	VII.
OE. A. 15470....	9	16	9	48	3.56	112	36.7	0.16	(VII.)
17 σ Coronae. (1st star).	6	16	10	0	2.24	55	49.4	0.15	A, XII, IX.
17 σ Coronae. (2d star).		16	10	0	2.24	55	49.3	0.15	A, XII, IX.
XII, 1343	....	16	10	8	1.15	31	44±	0.15	XII.
VII, 1307	Var.	16	10	12	3.56	112	38.1	0.16	VII.
(VII), 1844	....	16	10	12	3.56	112	35.2	0.15	(VII.)
(VII), 1842.....	Var.	16	10	13	3.56	112	34.9	0.15	(VII).
P. XVI, 35	7	16	11	37	3.77	120	35.7	0.15	VII,(VII) IX.
P. XVI, 36.....	6	16	11	38	3.78	120	36.0	0.15	A, XII, VI VII,(VII) IX.
P. XVI, 39....	7	16	11	49	3.51	109	54.8	0.16	VII.
XII, 1347	....	16	12	34	1.15	31	48.9	0.15	XII, VI.
VII, 1312	....	16	13	50	3.59	113	24.3	0.15	VII.
B. F. 2244.....	6	16	14	39	2.60	68	33.8	0.15	(VII).
GR. 2332.....	6	16	15	10	+0.99	29	56.4	0.15	A, XII. VII, IX.
GR. 2337.....	6	16	16	38	—1.04	16	18.0	0.15	IX.
5 ρ Ophiuchi. (N. star).	5	16	18	5	+3.59	173	9.3	0.14	VII, IX.
5 ρ Ophiuchi. (As one mass).		16	18	5	+3.59	113	9.3	0.14	IX.
5 ρ Ophiuchi. (S. star).		16	18	5	+3.59	113	9.4	+0.14	VII, IX.

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Gr. 2339.....	7	16	20	55	+1.86	45	1.4	+0.14	A, XII.
B. F. 2255.....	5	16	20	59	3.23	97	18.6	0.14	VII, (VII).
Gr. 2343.....	6.5	16	21	41	+1.30	34	30.6	0.14	A, XII, VII (VII), IX.
Gr. 2347.....	6.5	16	22	6	—0.17	20	36.1	0.14	IX.
Gr. 2345.... ...	6	16	22	8	+0.78	28	1.1	0.14	XII, VI, (VII), IX.
η^1 Draconis...	3.2	16	22	18	0.80	28	12±	0.14	VII.
14 η^2 Draconis		16	22	18	0.80	28	12.2	0.14	VII.
VII, 1335.....	....	16	22	54	3.02	87	44.3	0.14	VII.
VI, 1048.....	....	16	23	5	3.54	87	44.3	0.14	VI.
A, 863.....	....	16	23	34	3.02	87	45±	0.14	A, XII.
W. B. XVI, 432.	9	16	23	54	3.02	87	45.5	0.14	VII.
XII, 1367.....	....	16	24	30±	3.15	93	41.9	0.14	XII.
A, 868.....	....	16	25	14	3.02	87	45±	0.14	A, XII.
B. F. 2272.....	6	16	25	53	2.57	67	32.0	0.13	(VII).
B. F. 2270.. ...	7	16	25	55	2.82	78	18.3	0.13	IX.
(VII), 1878.....	Var	16	27	4	3.44	106	53.7	0.13	(VII.)
P. XVI, 111	5	16	28	9	3.94	124	59.7	0.13	(VII), IX.
A, 870.....	....	16	28	27	2.64	70	43.8	0.13	A, XII.
P. XVI, 127	6	16	29	20	2.11	51	39.0	0.13	IX.
A, 872.....	....	16	29	56	2.64	70	47.2	0.13	A, XII.
VII, 1346.....	....	16	30	12	3.56	111	48.0	0.13	VII, (VII.)
IX, 1507.....	10	16	30	25	3.43	106	7.5	0.14	IX.
Oe. A. (S.) 15776	8	16	30	27	3.44	106	35.7	0 13	IX.
P. XVI, 140....	6	16	30	40	0.85	28	54.9	0.13	IX.
Ll. 30230.....	8½	16	30	51	2.86	80	36.6	0.13	XII, VI.
A, 874.....	....	16	31	30	3.00	86	39.2	0.13	A, XII.
A, 875.....	....	16	31	30±	+3.00	86	39.0	+0.13	A, XII.

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OE. A. (S.) 15798	9	16	31	33	+3.57	111	47.5	+0.13	IX.
A, 876.....	....	16	31	40±	2.87	80	36.7	0.13	A, XII.
VII, 1349.....	....	16	32	5	3 59	123	29.7	0.13	VII.
W. XVI, 597....	9	16	32	6	2.86	80	36.8	0.13	A, XII.
IX. 1511.....	11	16	32	43	+3.42	105	44.5	0.12	IX.
P.XVI, 182.....	6	16	32	44	—3.44	10	46.3	0.12	XII, VI, IX.
W. XVI, 621....	9	16	33	5	+2.87	80	37.0	0.13	A, XII.
LL.30388.....	9	16	33	13	0.85	29	16.5	0.12	XII.
17 Draconis .... (1st star.)	4.5	16	33	16	1.40	36	49.3	0.12	XII.
17 Draconis .... (2d star.)	....	16	33	16	1.40	36	49.3	0.12	XII, IX.
P.XVI, 142.....	7½	16	34	3	3.46	107	48.7	0.12	VI.
BR.2115.....	6	16	34	33	3.51	109	41.9	0.12	IX.
BR.2119.....	7.8	16	34	56	3.03	88	30.6	0.12	(VII.)
XII, 1388.....	....	16	35	8	1.63	40	50±	0.12	XII.
GR.2369.....	6.5	16	35	29	1.20	33	44.4	0.12	XII.
LAC. 6950	6.7	16	35	36	3.84	121	51.9	0.12	VII, (VII), IX.
GR.2370.....	6.7	16	35	40	+0.59	26	40.6	0.12	IX.
P.XVI, 195.....	6	16	36	3	—2.64	12	18.4	0.12	IX.
W.XVI, 693....	9	16	36	59	+2.76	76	10±	0.12	A, XII.
P.XVI, 159.....	6.7	16	37	11	3.74	118	16.5	0.12	IX.
P.XVI, 172.....	6	16	38	37	2.14	53	15.4	0.12	(VII), IX.
W.XVI, 732....	9	16	38	48	2.76	76	9.5	0.12	A, XII.
W.XVI, 739....	8.9	16	39	17	2.76	76	9.1	0.12	A, XII, VI.
RUEMKER, 5537	....	16	39	30	3.00	86	53.0	0.12	A, XII, VI.
GR.2374...	5½	16	40	25	1.21	34	4.7	0.11	A, XII, VI.
BR.2134.....	7½	16	40	36	3.02	87	32.1	0.12	A, XII.
VI, 1069.....	....	16	41	10±	2.76	76	1.1	0.11	VI.
W. XVI, 782....	9	16	41	41	+2.76	76	6.6	+0.11	A, XII, VI.

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W. B. XVI, 790.	8.9	16	42	7	+2.76	75	56.6	+0.11	VI, VII.
B. F. 2316	7	16	42	14	2.82	78	38.7	0.11	VII.
W. XVI, 794	6.7	16	42	23	2.76	76	11.0	0.11	A, XII.
Gr. 2377	5	16	42	56	1.13	32	59.6	0.11	VII, (VII), IX.
Gr. 2376	6	16	43	20	1.92	47	32.2	0.11	(VII).
Lac. 7015 / Ll. 30599	6.7	16	43	43	3.65	114	37.0	0.11	IX.
Ll. 30625	7	16	44	36	3.67	115	23.2	0.11	XII.
VI, 1075	....	16	45	10±	2.73	74	46.7	0.11	VI.
W. B. XVI, 853.	9	16	45	10	2.73	74	56.7	0.11	XII, VI.
VI, 1076	....	16	46	0	2.72	74	29.7	0.11	VI.
S Herculis	Var	16	46	12	2.73	74	50.8	0.11	A, XII, (VII) IX.
A, 901	....	16	46	50±	2.70	73	52.1	0.09	A, XII, VI.
VI, 1079	....	16	47	10±	2.70	73	54.6	0.11	VI.
Lac. 7047	7	16	47	22	3.87	122	17.9	0.11	VII, (VII), IX.
A, 902	....	16	47	29	2.71	73	57.9	0.11	A, XII, VI.
B. F. 2330	8	16	47	41	2.72	74	23.2	0.11	A, XII.
A, 904	....	16	47	57	+2.70	73	51±	0.11	A, XII.
Gr. 2391	6.7	16	48	41	−2.78	12	16.3	0.10	IX.
P. XVI, 232	6	16	48	49	+3.46	106	36.3	0.10	(VII).
Ll. 30765	8.9	16	49	19	3.48	107	55.9	0.10	(VII).
Br. 2153	6	16	52	19	3.67	114	54.0	0.10	VII, (VII), IX.
Gr. 2390	5.6	16	53	20	0.81	29	26.2	0.10	A, XII, VI, (VII), IX.
VI, 1085	11½ to 13½	16	52	30	3.36	102	42.0	0.10	VI, VII.
Gr. 2393	6	16	53	33	0.63	27	42.2	0.10	XII.
B. F. 2343	6.7	16	54	23	2.92	83	13.7	0.10	VII.
XII, 1424	....	16	55	5	0.85	30	2±	0.09	XII.
P. XVI, 282	6	16	55	6	0.61	27	26.3	0.09	IX.
Oe. A. 16707	8.9	16	55	35	+0.85	30	0.8	+0.09	XII, VI.

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B. F. 2345	6	16	55	52	+2.72	74	52.0	+0.09	VII.
Ll. 30971	6½	16	56	20±	3.54	110	12.4	0.09	VI.
Ll. 30976	7½	16	56	33	3.54	110	17.6	0.09	A, XII, VI.
P. XVI, 268.....	5	16	56	36	3.93	123	56.6	0.09	A, XII, VII.
P. XVI, 291.....	5½	16	57	4	1.11	33	7.6	0.09	XII.
P. XVI, 273	7	16	57	20	3.53	110	18.9	0.09	A, XII, VI.
P. XVI, 277 ...	6	16	57	38	3.32	100	54.7	0.09	VII.
Br. 2162.....	6	16	58	44	+3.58	111	23.4	0.09	(VII), IX.
Gr. 2411.....	6.7	16	58	46	−1.23	16	41.1	0.09	IX.
P. XVI, 289	6	16	58	50	+3.09	90	43.2	0.09	A, XII.
W. XVI, 1102...	9	16	59	28	3.20	95	59.7	0.09	XII.
R Ophiuchi.....	Var	17	0	35	3.44	105	55.5	0.09	(VII), IX.
W. XVI, 1135...	8.9	17	0	50	2.97	85	28.3	0.09	A, XII, VII.
P. XVI, 307	6	17	1	17	1.83	46	1.2	0.09	A, XII.
W. XVI, 1144...	8.9	17	1	18	+2.97	85	52±	0.09	A, XII.
Gr. 2419	7.6	17	2	8	−2.94	12	9.8	0.08	IX.
W. XVI, 1160...	8	17	2	11	+2.97	85	24.3	0.09	A, XII.
Br. 2172.....	7.8	17	2	13	2.15	54	30.5	0.08	IX.
A, 23.....	...	17	2	42	2.97	85	23.1	0.08	A, XII.
21 μ Draconis .. (S. star).....	5.4	17	2	45	1.24	35	21.8	0.08	XII, IX.
21 μ Draconis... (N. Star).....	5.4	17	2	45	1.24	35	21.8	0.08	XII, IX.
W. XVII, 12....	8.9	17	3	21	+2.98	85	54±	0.08	A, XII, VI.
Ll. (F.) 2891 ...	8	17	3	31	−11.37	5	8.0	0.08	VII, (VII).
P. XVII, 3.....	5	17	3	36	+2.12	53	54.1	0.08	VII, (VII), IX.
A, 928.....	....	17	5	22	+3.06	89	33.0	0.08	A, XII.
Oe. A. 16877....	8.9	17	5	31	+1.12	33	40.4	0.08	VI.
Gr. 2427	6	17	5	37	−1.94	14	31.8	0.08	IX.
W. B. XVII, 61.	9	17	5	50	+3.02	87	42.3	+0.08	XII, VI.

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W. XVII. 69....	8.9	17	6	4	+3.02	87	43.4	+0.08	A, XII, VI.
P. XVII, 15....	8	17	6	6	2.48	65	35.6	0.08	IX.
Br. 2174	6.7	17	6	27	3.72	116	49.9	0.08	IX.
W. XVII, 79...	7	17	6	31	3.06	89	29.7	0.08	A, XII.
36 A^1 Ophiuchi	....	17	7	40	3.68	116	25.0	0.09	A, XII, VII, (VII), IX,
36 A Ophiuchi (as one mass)	5	17	7	40	3.68	116	25.0	0.09	VII (VII), VII.
36 A^2 Ophiuchi	....	17	7	40	3.68	116	24.9	0.09	A, XII, VII, (VII), IX.
W. XVII, 106...	9	17	8	17	3.10	91	12.2	0.08	A, XII, VI, VII.
VII, 1391.....	...	17	8	20	3.46	106	43.9	0.08	VII.
Br. 2180.....	7.8	17	8	46	3.67	115	9.9	0.09	(VII).
P. XVII, 23....	5.6	17	8	56	3.90	123	31.1	0.07	A, XII, VII, (VII) IX.
64 α^1 Herculis..	Var	17	8	57	2.73	75	27.9	0.07	A, XII, VI, VII. (VII).
α^2 Herculis.....	8	17	8	57	2.73	75	27.9	0.07	A, XII, VI, VII. (VII).
W. B. XVII, 127.	8.9	17	9	18	3.10	91	8.9	0.07	A, XII, VII.
VII, 1399.....	....	17	9	41	3.46	106	24.4	0.07	VII.
Ruemker 5746..	5	17	9	56	3.02	87	40.3	0.07	A, XII, VI.
P. XVII, 28....	6½	17	10	12	3.91	122	24.7	0.07	A, XII.
39 Ophiuchi.... (S. star).	6	17	10	23	3.65	114	8.8	0.07	XII, VI.
39 Ophiuchi....	6	17	10	23	3.65	114	9±	0.07	VI, IX.
39 Ophiuchi.... (N. star)	7	17	10	24	3.66	114	8.6	0.07	XII, VI.
Br. 2182.....	6	17	10	29	3.66	113	55.8	0.07	A, XII, IX.
P. XVII, 61....	6	17	11	28	0.51	26	59.0	0.07	XII, IX.
A, 945.....	....	17	12	12	3.10	91	22.6	0.07	A, XII.
P. XVII, 43....	6½	17	12	37	3.49	107	37.4	0.07	A, XII.
W. XVII, 201...	8	17	13	14	3.16	93	55.0	0.07	A, XII.
Ll. 31499.	7½	17	13	58	3.37	102	57.1	0.07	XII, VI.
Br. 2188.....	7	17	14	2	3.67	114	46.7	0.07	VII. (VII), IX.
VI, 1117.....	....	17	14	7	+3.64	113	20.4	+0.07	VI.

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GR. 2432.....	7	17	14	34	+0.72	29	9.1	+0.07	IX.
GR. 2433.....	6	17	14	53	0.73	29	11.8	0.07	IX.
W. XVII, 262 ..	7	17	16	18	3.23	96	59.0	0.07	A, XII.
VI, 1119.....	...	17	17	0±	2.25	58	0.7	0.06	VI.
P. XVII, 79.....	8	17	17	7	3.28	99	14.2	0.06	A, XII.
P. XVII, 76.....	6	17	17	14	3.57	111	19.3	0.06	IX.
A, 957.....	....	17	17	24	2.25	57	59±	0.06	A, XII.
W. XVII, 286...	8	17	17	36	3.19	95	12.3	0.06	A, XII.
GR. 2435	6	17	17	38	1.97	49	54.1	0.06	(VII).
XII, 1483	....	17	17	50±	+0.96	31	53.1	0.06	XII.
GR. 2437.....	6	17	18	10	−0.96	18	4.7	0.06	VII. (VII). IX.
XII, 1485.....	....	17	18	20	+0.96	31	54.0	0.06	XII, VI.
A, 960.....	....	17	19	7	2.24	57	54.3	0.06	A, XII.
ρ^1 Herculis..	4	17	19	22	2.07	52	44.2	0.06	VI, IX.
75 ρ^2 Herculis		17	19	23	2.07	52	44.3	0.06	VI, IX.
A, 963.....	....	17	19	56	2.24	57	38.2	0.06	A, XII.
A, 964.....	....	17	19	59	2.23	57	35.8	0.06	A, XII.
B. F. 2389.... P. XVI, 99....	5.4	17	20	0	3.19	94	58.5	0.06	A, XII.
BR. 2208	6.7	17	20	7	2.07	52	56.2	0.06	(VII).
P. XVII, 109....	6	17	21	25	2.58	69	48.7	0.06	A. XII, (VII) IX.
XII, 1495.....	....	17	22	21	0.90	31	14.9	0.06	A, XII.
P. XVII, 112....	5.6	17	23	27	3.06	89	34.1	0.06	XII, VI.
P. XVII, 117....	6.7	17	23	59	3.72	116	10.3	0.05	IX.
RADCLIFFE 3714.	6	17	24	4	0.77	29	50.8	0.06	VII, (VII), IX.
P. XVII, 127....	6	17	25	6	3.01	87	11.1	0.06	XII.
VI, 1130.....	....	17	26	11	3.63	112	53.3	0.05	VI.
B. A. C. 5925...	5.6	17	26	32	3.91	123	29.6	0.05	VII.
A, 974.....	....	17	27	24	+2.15	55	5.3	+0.05	A, XII.

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W. XVII, 493...	6	17	27	48	+3.31	101	9.4	+0.05	A, XII, VI.
VI, 1133.....	....	17	28	0±	2.65	72	19.6	0.05	VI.
A, 976.....	....	17	28	5	2.15	55	10.0	0.05	A, XII.
VI, 1134.....	....	17	28	10±	2.65	72	24.1	0.05	VI.
W. B. XVII, 508.	8	17	28	14	2.77	77	23.9	0.05	XII, VI.
VI, 1137.....	....	17	28	37	2.65	72	19±	0.05	VI.
f^1 Ophiuchi....	....	17	28	40±	2.85	80	20.5	0.05	A, XII.
53 f^2 Ophiuchi..	6	17	28	41	2.85	80	19.8	0.05	A, XII.
VI, 1138.....	....	17	28	46	2.65	72	24±	0.05	VI.
GR. 2144.....	6	17	29	10	1.91	48	40.1	0.05	VII. (VII). IX.
LL. 32112	7	17	30	17	2.15	55	9.9	0.04	A, XII, VI.
B. F. 2406 .. / P. XVII, 156	6½	17	30	26	3.43	105	29.8	0.05	A, XII.
BR. 2219.....	6	17	31	14	3.61	111	50.1	0.04	(VII).
P. XVII, 176 ...	6	17	31	51	2.28	59	8.2	0.04	IX.
P. XVII, 163....	7	17	31	52	3.91	122	7.7	0.04	VII, (VII).
VII, 1423	....	17	32	2	3.91	122	10.9	0.04	VII, IX.
W. XVII, 617...	8	17	32	46	3.02	87	52.3	0 04	A, XII.
P. XVII, 167....	7	17	32	49	3.88	122	8.7	0.04	VII. (VII), IX.
W. XVII, 619...	7	17	32	50	3.02	87	53.8	0.04	A, XII, VI.
W. XVII, 637...	9	17	33	37	3.02	87	54.5	0.04	A, XII, VI.
W. B. XVII, 636.	8.9	17	33	51	3.38	102	50.8	0.04	(VII).
LL. 32286.....	7½	17	34	50±	1.92	49	9.5	0.04	XII.
P. XVII, 196....	6	17	35	14	2.27	58	43.9	0.04	(VII), IX.
W. B. XVII, 672	9	17	35	47	3.18	94	42.4	0.04	VI.
BR. 2228.....	6.7	17	35	58	2.47	65	25.4	0.03	IX.
P. XVII, 203....	6	17	36	23	2.70	73	59.3	0.03	A, XII, IX.
P. XVII, 195....	7	17	36	52	+3.61	112	8.3	0.04	A, XII.
OE. A. (N.) 17413	7	17	37	8	−0.32	21	26.4	+0.03	IX.

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Oe. A. (N.) 17415	9	17	37	9	−0.37	21	32.7	+0.03	IX.
Oe. A. (N.) 17419	8	17	37	18	−0.30	21	33.0	0.03	IX.
P. XVII, 216 ...	6	17	38	19	+3.01	87	21.9	0.03	(VII).
IX, 1624.....	10	17	38	30	2.55	68	29.9	0.03	IX.
(VII), 1974.....	10	17	39	4	2.55	68	27.1	0.03	(VII).
P. XVII, 227....	5½	17	41	3	3.89	121	39.4	0.03	A, XII.
P. XVII, 231....	7	17	41	14	3.86	120	33.0	0.03	A, XII.
XII, 1533	....	17	42	0±	3.02	87	43.6	0.03	XII.
P. XVII, 238....	6.7	17	42	32	3.75	117	1.1	0.03	IX.
P. XVII, 243....	7	17	43	10	3.86	120	31.1	0.03	A, XII.
P. XVII, 255....	6	17	43	22	+2.62	70	42.2	0.02	IX.
31 ψ^1 Draconis ...	4.5	17	44	10	−1.10	17	47.5	0.03	VI, VII, IX.
31 ψ^1 Draconis ... (2nd star).	6	17	44	12	−1.09	17	46.9	0.03	VI, VII, IX.
P. XVII, 265....	6	17	46	7	+3.32	100	52.0	0.02	VII.
A, 1002.....	....	17	46	14	3.03	88	15.5	0.02	A, XII.
Br. 2245.....	6.7	17	48	1	1.96	49	59.4	0.02	IX.
Lac. 7508..... Ll. 32727.....	6.7	17	48	48	3.78	118	2.6	0.02	IX.
XII, 1538	....	17	48	49	1.88	48	9.5	0.02	A, XII.
VI, 1156	....	17	49	5	3.31	100	21.7	0.02	VI.
P. XVII, 281...	6	17	49	8	3.44	105	47.3	0.02	(VII).
XII, 1539	....	17	49	29	1.08	33	51.2	0.02	XII.
Br. 2242.....	7	17	49	29	3.67	113	55.2	0.02	(VII).
P. XVII, 294....	5	17	51	4	3.85	120	14.5	0.02	A, XII, VII.
Ll. 32981.....	9	17	52	17	1.39	38	28.9	0.01	XII, VI.
Ll. 33032	7½	17	53	6	1.09	34	1.0	0.01	XII.
P. XVII, 327....	7.8	17	53	7	1.73	44	59.8	0.01	A, XII.
B. F. 2444.. P. XVII, 312	6	17	54	20	3.63	112	46.5	0.01	A, XII, IX.
W. B. XVII. 1115	8.9	17	54	25	+3.00	87	4.3	+0.01	VII, IX.

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P. XVII, 328....	6	17	54	47	+2.93	83	43.6	+0.01	A, XII.
LL. 32975.....	8	17	54	59	3.67	114	15.2	0.01	A, XII.
A, 1019.....	....	17	55	0	1.73	44	59±	0.01	A, XII.
RUEMKER, 6172 .	....	17	55	1	1.74	45	3.3	0.01	VI, VII.
P. XVII, 323....	6	17	55	10	3.58	110	44.0	0.01	A, XII, (VII), XI.
GR. 2495.....	9	17	55	50	1.52	40	44.0	0.01	VII.
LL. 33031.....	7.8	17	56	5	3.50	107	36.5	0.01	IX.
95 Herculis... (1st star.)	4.5	17	56	12	2.54	68	24.7	0.05	(VII.)
95 Herculis... (2d star)		17	56	12	2.54	68	24.7	0.05	(VII.)
P. XVII, 333....	7.8	17	56	17	3.68	114	18.9	0.01	A, XII, VI.
A, 1022.....	...	17	56	20±	3.68	114	28.9	0.01	A.
P. XVII. 339...	4	17	57	2	3.84	119	35.0	0.01	VI, VII.
OE. A. 17748....	8.9	17	57	20	1.56	41	35.2	0.00	XII, VI.
P. XVII, 342 ...	7	17	57	31	3.69	114	24.4	0.01	A, XII.
OE. A. 17761....	7	17	57	48	+1.56	41	31.9	0.00	XII, VI.
ARG. zone + 66° No. 1065.	9	17	58	11	—0.03	23	20.7	0.00	IX.
LL. 33303.....	9	17	58	36	—0.02	23	21.7	0.00	IX.
70 Ophiuchi .. (1st star).		17	59	8	+3.03	87	28.2	0.02	XII, VII, IX.
70 Ophiuchi .. (As one mass).	4.5	17	59	8	3.03	87	28.2	0.02	IX.
70 Ophiuchi .. (3d star).		17	59	8	3.03	87	28.2	0.02	XII, VII, IX.
W. XVII, 1237 ..	9	17	59	30±	3.19	94	43.7	0.00	A, XII.
W. B. XVII, 1235	7	17	59	36	3.18	94	45.5	0.00	XII, VI.
P. XVII, 356....	7	17	59	42	3.59	111	27.2	0.00	A, XII, VI.
GR. 2502.....	6	17	59	53	1.56	41	32.4	0.00	A, XII, VII.
P. XVII, 359....	6.5	18	0	10	3.80	118	28.1	0.00	VII, IX.
OE. A. 17803....	9	18	0	14	1.74	45	2.6	0.00	A, XII, VI.
IX, 1657.....	10	18	0	28	3.50	107	33.5	0.00	IX.
A. 1030.....	....	18	0	30±	+1.74	45	1.5	+0.00	A, XII.

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A, 1031.	....	18	0	53	+1.74	45	9.3	—0.00	A, XII.
BR. 2272.	7.8	18	1	4	3.01	87	31.9	0 00	IX.
P. XVII, 364	7	18	1	9	3.60	111	27.9	0.00	XII, VI.
P. XVII, 367.	5.6	18	2	2	3.87	120	44.7	0.00	VII, (VII), IX.
100 Herculis. (1st star).	5.6	18	2	47	2.42	63	54.8	0.04	(VII).
100 Herculis. (2d star).		18	2	47	2.42	63	54.6	0.04	(VII).
LL. 33374.	7.8	18	3	29	2,27	59	1.2	0.00	VII, (VII).
BR. 2276	6	18	4	6	3.66	113	43.5	0.00	IX.
VII, 1463	Var	18	4	22	2.27	58	59.9	0.01	VII, (VII).
W. B. XVIII, 61.	7	18	5	12	+3.28	98	45.4	0.01	VI.
P. XVIII, 23.	7	18	5	18	—0.07	23	4.3	0.01	IX.
A, 1035.	....	18	7	10	+3.08	90	22.8	0.01	A, XII.
LL. 33493.	7½	18	7	22	3.06	89	20.8	0.01	A, XII.
GR. 2527.	6	18	7	58	1.23	35	45.2	0.01	A, XII.
VI, 1184	....	18	8	24	3.81	118	58.2	0.01	VI.
W. B. XVIII, 147	8.9	18	8	42	3.27	98	31.5	0.01	VI.
GR. 2530.	6	18	8	55	2.00	51	15.7	0.01	IX.
GR. 2531.	8	18	9	20	1.53	40	56.0	0.01	VII.
LL. 33537.	6.7	18	9	29	3.80	118	41.5	0.01	IX.
P. XVIII, 24	6	18	10	14	3.76	117	5.1	0.01	VII, IX.
BR. 2292.	6.7	18	10	31	3.31	99	48.0	0.01	(VII).
W. XVIII, 203.	7	18	10	44	3.05	89	2.2	0.01	A, XII.
GR. 2536.	7	18	11	45	1.53	40	53.1	0.02	VII.
GR. 2533.	6	18	11	46	1.87	47	52.9	0.02	(VII).
VII, 1471	....	18	11	48	3.36	102	15.7	0.02	VII.
GR. 2533.	6.5	18	11	50±	1.87	47	52.9	0.02	IX.
GR. 3539.	6	18	12	29	1.05	33	27.2	0.02	A, XII, VI.
A, 1042.	....	18	12	57	+1.92	49	7.6	—0.02	A, XII

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BR 2296	6	18	12	57	+3.45	105	52.8	—0.02	(VII.)
GR. 2538.....	6	18	13	9	1.92	49	6.6	0.02	XII, VII.
W. B. XVIII.265	7	18	13	17	3.26	98	1.9	0.02	VI.
LL. 33779.....	8	18	13	20	2.46	65	36±	0.02	XII, VI, (VII.)
GR. 2542	8	18	13	42	1.53	40	57.1	0.02	VII.
VI, 1194.....	....	18	14	24	3.27	98	21.3	0.02	VI, VII.
LAC. 7686.....	7	18	14	28	3.64	112	58.6	0.02	VI.
VI, 1195	....	18	14	38	3.27	98	20.3	0.02	VI.
BR. 2302	6.7	18	15	3	2.32	60	23.2	0.02	IX.
BR. 2304....	7	18	15	34	2.34	61	4.3	0.02	(VII.)
BR. 2303.....	6	18	16	56	2.50	66	46.6	0.03	A, XII, IX.
GR. 2549.....	6	18	17	0	1.41	38	42.5	0.02	A, XII.
RADCLIFFE 3396	6	18	17	18	2.65	72	14.1	0.03	IX.
LL. 33885.....	9	18	17	34	3.64	113	2.8	0.02	VI, VII.
GR. 2555.....	5	18	18	21	1.54	40	56.3	0.03	A, XII, VII.
GR. 2556.....	6	18	18	33	+1.41	38	45.4	0.03	XII.
P. XVIII, 93....	6	18	19	56	—0.10	22	37.5	0.03	IX.
GR. 2563.....	7	18	20	19	+1.86	47	36.0	0.03	VII, (VII.)
XII, 1603.....	6	18	20	39	+3.50	107	52.5	0.03	A, XII.
Br. 2331.....	7	18	21	3	—0.91	18	32.7	0.02	(VII.)
P. XVIII. 72...	7	18	21	49	+3.94	123	7.6	0.03	VII, (VII.)
W. B. XVIII, 483	8.9	18	21	50	2.92	83	28.6	0.03	VII, (VII.)
BR. 2313.....	5	18	22	4	3.42	104	38.7	0.03	A, XII, VII, (VII.)
BR. 2314.....	6.7	18	22	39	3.42	104	39.8	0.03	A. XII, (VII.)
IX, 1693...	8.9	18	22	46	2.49	66	13.2	0.03	IX.
P. XVIII, 79....	5.6	18	22	53	3.94	123	4.1	0.03	XII, VI, VII, (VII), IX.
A, 1057.....	....	18	23	0±	3.42	104	42.5	0.03	A, XII.
P. XVIII, 88....	6	18	23	59	+3.52	108	59.2	—0.03	VII.

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P. XVIII, 92...	6	18 24 7	+3.51	108 29.3	—0.03	A, XII.
P. XVIII, 100...	6	18 24 25	2.50	66 13.0	0.03	(VII), IX.
Br. 2320.....	7.8	18 24 41	3.43	105 16.1	0.04	(VII), IX.
Ll. 34222.....	9	18 24 59	3.62	112 22.9	0.03	VI.
Br. 2323.....	6½	18 25 35	3.42	104 57.4	0.03	A, XII.
Br. 2319.....	7	18 25 36	3.65	114 11.9	0.04	(VII).
P. XVIII, 96...	5½	18 25 46	3.94	123 6.6	0.03	A, XII.
P. XVIII, 102..	7	18 25 50	3.51	108 27.7	0.03	A, XII.
(VII), 2046.....	....	18 25 53	3.43	105 16.7	0.04	(VII).
Gr. 2590.....	6	18 25 58	0.82	30 32.0	0.04	A, XII.
P. XVIII, 107...	6	18 26 30	3.43	104 56.6	0.04	A, XII.
A, 1066.....	....	18 26 42	2.60	70 29.4	0.03	A, XII, VI.
Ll. 34347.....	8½	18 27 0±	2.60	70 37.6	0.04	VI.
Ll. 34310.....	8	18 27 1	3.55	109 52.6	0.04	VII.
P. XVIII, 116...	6	18 27 34	2.49	66 28.5	0.04	A, XII, (VII) IX.
Br. 2329.....	6	18 28 6	3.33	101 4.4	0.04	IX.
P. XVIII, 120...	7	18 29 26	3.49	107 18.5	0.04	A, XII, VI.
P. XVIII, 132...	6	18 30 18	2.49	66 29.8	0.04	A, XII, IX.
Br 2332.....	6½	18 30 25	3.59	111 30.0	0.04	A, XII.
P. XVIII, 128...	7	18 30 36	3.48	107 20.2	0.04	A, XII.
Br. 2333.....	6	18 30 55	3.65	113 36.6	0.04	A, XII, IX.
A, 1079.....	8.9	18 30 58	1.40	38 22.0	0.04	A, XII.
Gr. 2612.....	5	18 31 6	1.36	37 44.8	0.04	VII.
Br. 2339.....	7	18 31 10	2.00	51 12.5	0.04	XII.
A, 1080.....	8.9	18 31 24	1.44	38 59.4	0.04	A, XII.
Br. 2335.....	6½	18 31 26	3.59	111 9.2	0.04	A, XII.
A, 1081.....	7	18 31 37	1.40	38 18.8	0.05	A, XII.
Gr. 2627.....	6.7	18 35 31	+1.93	49 10.7	—0.05	IX.

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GR. 2655	5.6	18	35	46	−2.86	12	33.1	−0.05	IX.
P. XVIII, 160	6	18	35	58	+2.05	51	44.9	0.05	(VII).
BR. 2348	6	18	36	5	1.18	34	52.1	0.06	IX.
GR. 2642	6	18	36	53	0.73	29	24.2	0.05	IX.
P. XVIII, 170	6	18	37	0	1.39	37	55.2	0.05	IX.
P. XVIII, 155	6	18	37	8	3.70	115	7.9	0.05	IX.
XII, 1638	....	18	38	34	1.76	45	8.1	0.06	XII, VI.
GR. 2644	6.7	18	39	0±	2.00	50	49.4	0.06	IX.
GR. 2646	7.8	18	39	15	1.76	45	11.8	0.06	A, XII, VI.
OE. A. 18565	9	18	39	15	1.76	45	11.4	0.06	XII, VI.
GR. 2658	6	18	39	51	0.53	27	22.4	0.06	IX.
δ Aquilae (1st star)	6	18	40	1	3.10	91	5.4	0.06	(VII).
δ Aquilae (2d star)		18	40	0±	3.10	91	5.5	0.06	(VII).
4 ε^1 Lyræ (1st star)	4	18	40	12	1.98	50	27.6	0.06	A, XII, VII.
ε^1 Lyræ (2d star)		18	40	12	1.98	50	27.5	0.06	A, XII, VII.
δ ε^2 Lyræ (1st star)	4	18	40	14	1.99	50	31.0	0.06	A, XII, VII.
ε^2 Lyræ (2d star)		18	40	14	1.99	50	31.0	0.06	A, XII, VII.
BR. 2347	7.8	18	40	27	3.57	110	24.4	0.06	IX.
6 ζ^1 Lyrae	4.5	18	40	28	2.06	52	31.5	0.06	VII.
ζ^2 Lyræ	....	18	40	30	2.07	52	32.1	0.06	VII.
A, 1092	....	18	40	37	+2.53	67	49.3	0.06	A, XII.
BR. 2412	6	18	40	37	−7.76	6	55.3	0.06	(VII).
LL. 34875	Var	18	40	49	+3.21	95	50.2	0.06	VII, (VII).
XII, 1647	....	18	41	0	3.25	97	35.8	0.06	XII.
VII, 1512	....	18	41	48	3.61	112	4±	0.06	VII.
BR. 2370	6.7	18	42	50	0.71	29	5.0	0.06	IX.
GR. 2671	5	18	43	56	1.34	37	9.0	0.06	VII.
VII, 1514	....	18	44	12	+2.21	56	49.3	−0.06	VII, (VII).

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GR. 2672.....	6	18	44	16	+1.55	40	42.4	—0.06	VII, (VII).
LAC. 7898.....	6.7	18	44	40	3.86	120	52.9	0.06	VII, (VII), IX.
GR. 2677.....	5.6	18	44	57	1.58	41	22.7	0.06	A, XII. VII,
10 β^1 Lyrae....	Var	18	45	28	2.21	56	46.9	0.07	A. XII. VI VII, (VII) IX.
β^2 Lyrae	8	18	45	30	2.21	56	47.5	0.07	A. XII. VI VII, (VII) IX.
A, 1100.....	....	18	47	35	2.53	67	31±	0.07	A, XII.
P. XVIII, 225...	6	18	48	26	3.64	113	19.8	0.07	(VII).
A, 1101.....	....	18	48	36	3.12	91	58±	0.07	A, XII.
GR. 2699.....	5	18	48	47	+1.35	37	11.3	0.07	VII, (VII).
GR. 2719.....	6	18	48	53	—1.47	16	3.6	0.07	VII, IX.
o^1 Draconis	9	18	49	20	+0.88	30	45.4	0.07	VII, (VII).
47 o^2 Draconis ..	5.4	18	49	21	0.88	30	45.9	0.07	VII, (VII).
GR. 2700.....	8	18	49	31	1.86	47	13.3	0.07	VII, (VII).
GR. 2701.....	7.8	18	49	35	1.87	47	15.2	0.07	VII, (VII).
LL. 35281.....	6	18	49	53	3.12	91	57.6	0.07	A, XII.
63 6^1 Serpentis	4.3	18	50	0	2.98	85	57.5	0.07	A, XII.
63 6^2 Serpentis		18	50	1	2.98	85	57.6	0.07	A. XII.
BR. 2377.....	....	18	50	2	2.98	85	57.6	0.07	VII.
P. XVIII, 241...	7	18	50	8	3.02	87	41.4	0.07	A, XII, VI.
LL. 35845.....	8.9	18	50	17	2.20	56	10.6	0.07	IX.
BR. 2381.....	6	18	50	18	2.20	56	11.4	0.07	IX.
W. XVIII, 1269.	8	18	50	40	3.02	87	43±	0.07	A, XII.
BR. 2388.....	5.6	18	52	20	2.24	57	15.5	0.07	(VII).
IX, 1732.....	....	18	52	51	2.24	57	32.3	0.08	IX.
P. XVIII, 259...	8	18	53	32	2.73	75	2.3	0.08	VI, VII, IX.
VII, 1539.....	....	18	54	0	2.77	76	54.3	0.08	VII, (VII).
W.B.XVIII, 1364	....	18	54	38	2.86	80	48.7	0.08	VII, (VII).
GR. 2742.....	6.7	18	56	2	+0.61	27	46.4	—0.08	(VII), IX.

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P. XVIII, 267...	6	18	56	23	+3.86	121	13.7	−0.08	A, XII.
RADCLIFFE 4177	8	18	57	44	−1.98	14	23.0	0.08	IX.
BR. 2421.....	7	18	57	45	−1.98	14	22.9	0.08	IX.
15 h¹ Aquilae...	8	18	58	21	+3.17	94	13.6	0.08	A, XII.
15 h² Aquilae...	6	18	58	22	3.17	94	13.0	0.08	A, XII.
A, 1119.....	....	18	58	28	2.75	76	19±	0.08	A, XII.
GR. 2753.....	6	18	59	10	1.41	37	55.3	0.08	A, XII.
BR. 2403.....	8	18	59	24	2.63	71	2.6	0.08	IX.
P. XVIII, 293...	7	18	59	38	3.78	118	49.8	0.08	A, XII.
W. XVIII, 1525.	9	19	0	0±	2.76	76	19.7	0.09	XII.
(VII), 2103.....	9	19	0	17	2.89	81	56.9	0.09	(VII).
VII, 1546.....	Var	19	0	21	2.89	81	57.3	0.09	VII, (VII).
W.B.XVIII, 1559	9	19	0	34	2.76	76	20.9	0.09	VI.
P. XVIII, 301...	7	19	0	36	3.66	114	51.2	0.08	A, XII.
BR. 2402	6	19	0	56	3.53	109	28.9	0.09	A, XII.
BR. 2409	6.7	19	1	26	2.50	65	56.4	0.09	VII.
P. XVIII, 318...	6.5	19	1	40	2.37	61	34.0	0.09	(VII).
GR. 2771.....	6	19	2	7	0.66	28	5.6	0.09	IX.
LAC. 8019.....	6½	19	2	30	+3.82	120	12.3	0.09	VI.
BR. 2440.....	6	19	3	11	−2.46	13	7.7	0.09	XII, VI, IX
GR. 2777.....	7	19	5	21	+1.53	39	50.3	0.09	A, XII.
VI, 1241.....	...	19	5	51	3.33	101	28.7	0.09	VI.
BR. 2420.....	8	19	5	59	2.29	58	34.1	0.10	IX.
B. F. 2591	6	19	7	15	+2.57	68	39.2	0.10	(VII).
XII, 1707	....	19	7	37	−8.59	6	16.2	0.10	XII.
(VII), 2113.....	....	19	8	53	+3.05	89	9.7	0.10	(VII).
VII, 1551.....	Var	19	9	23	3.53	109	31.5	0.10	VII, (VII).
BR. 2425.....	6	19	9	54	+2.59	68	59.1	−0.10	(VII).

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LL. 36268.....	6.5	19 10 43	+2.75	75 40.5	—0.10	VI.
P. XIX, 39	8	19 10 52	3.51	109 5.1	0.10	A, XII, VI.
LL. 36281	7½	19 11 30	3.10	91 10.0	0.10	A, XII.
LL. 36286.....	8½	19 11 35	3.10	91 14.0	0.10	A, XII.
P. XIX, 50.....	6	19 11 52	3.42	105 45.3	0.09	XII, VII.
BR. 2426.....	8	19 12 0	3.44	106 8.1	0.10	A, XII.
BR. 2429.....	7	19 12 8	3.07	89 48.2	0.10	(VII.)
GR. 2803.....	8½	19 12 20	1.72	43 9.6	0.10	A, XII.
XII, 1706... ...	9	19 12 20±	1.72	43 13.2	0.10	XII.
GR. 2808.....	7.8	19 13 2	1.60	40 48.0	0.10	VII, (VII.)
P. XIX, 61.. ...	6.7	19 13 9	3.59	112 38.0	0.10	IX.
GR. 2810.....	8.9	19 13 16	1.71	43 2.7.	0.10	A, XII.
GR. 2809.....	6.7	19 13 16	1.72	43 14.4	0.10	A, XII.
P. XIX, 67.....	7	19 14 17	3.52	109 28.1	0.10	A, XII, VI.
GR. 2812.....	6	19 14 47	2.00	49 52.1	0.11	(VII.)
XII, 1719.....	....	19 15 16	3.56	110 52.3	0.11	XII.
GR. 2815.....	6	19 15 18	1.60	40 39.7	0.11	(VII), IX.
XII, 1721.....	....	19 15 50±	3.55	110 50.0	0.11	XII.
W. B. XIX, 357.	6	19 15 56	3.08	90 29.2	0.11	IX.
P. XIX, 84.....	6	19 16 42	3.75	118 6.3	0.11	IX.
GR. 2822.....	5½	19 16 51	1.33	35 51.3	0.11	A, XII.
LL. 36557.....	8½	19 17 47	3.42	105 16±	0.11	XII.
P. XIX, 100....	8	19 18 18	3.40	104 46.2	0.11	A, XII.
P. XIX, 102....	6	19 19 2	3.80	119 59.4	0.11	A, XII.
P. XIX, 107 ..	6	19 19 4	3.41	105 18.1	0.11	A, XII.
P. XIX, 110...	7	19 19 19	3.41	104 47.8	0.11	A, XII, VI.
BR. 2460.....	7	19 19 37	2.15	53 47.7	0.11	(VII.)
BR. 2457.....	7	19 19 56	+2.60	69 58.4	—0.11	(VII.)

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Gr. 2832	6	19	20	0	+1.90	46	52.4	−0.11	VII.
P. XIX,131.....	6½	19	20	7	1.58	39	58.5	0.11	XII.
Br. 2459	6.5	19	20	15	2·48	65	18.7	0.10	(VII), IX.
Br. 2462.....	6.7	19	21	0	2.62	70	21.4	0.11	(VII).
P. XIX, 140.....	8	19	21	17	+1.58	40	0.1	0.12	XII, VI.
A, 1163.....	7.8	19	21	19	−1.12	16	41.3	0.12	A, XII.
XII, 1740.....	....	19	21	30±	+2.02	49	55.0	0.12	XII.
P. XIX, 126 ...	6	19	22	8	3.71	117	14.5	0.11	VII, IX.
P. XIX, 130.....	8.9	19	23	18	3.57	111	35.5	0.12	IX.
VI, 1260.....	....	19	23	42	3.58	112	12.9	0.12	VI.
Br. 2468	6.7	19	23	17	2.37	60	48.2	0.12	(VII).
P. XIX, 138.....	6.7	19	23	29	3.56	111	34.1	0.12	IX.
Gr. 2849.....	7.8	19	23	29	1.59	40	6.6	0.12	(VII), IX.
W. B. XIX, 561.	7	19	23	55	3.26	98	36.7	0.12	VI.
Ll. 36872.....	7	19	24	53	3.74	118	15.3	0.12	VII.
XII, 1746.....	....	19	25	23	1.51	38	32±	0.12	XII.
6 β ^{1}Cygni.....	3	19	25	41	2.42	62	18.1	0.12	VI.
6 β ^{2}Cygni.....	7	19	25	43	+2.42	62	17.8	0.12	VI, (VII), IX.
Ll. (Fed) 3209 .	6	19	25	59	−2.03	13	41.4	0.12	VI, IX.
W. B. XIX, 621.	9	19	26	11	+3.25	98	15.7	0.12	VI.
A, 1168.....	....	19	26	30±	1.51	38	32.3	0.12	A, XII.
Gr. 2838.....	9	19	26	32	1.63	40	45.2	0.12	VII.
Lac. 8152.....	7	19	27	6	3.85	121	52.7	0.12	VI.
Gr. 2865.....	6.7	19	28	1	1.59	39	57.6	0.12	(VII).
Gr. 2872.....	6.7	19	28	45	1.81	35	0.3	0.13	A, XII.
Ll. 37057	6	19	28	45	+3.24	97	44.0	0.12	VI.
Gr. 2900.....	6	19	29	13	−3.50	10	39.0	0.13	IX.
Gr. 2876.....	6	19	30	15	+1.65	41	0.5	−0.13	VII.

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A, 1173.....	8.9	19	31	2	+0.95	30	6.4	—0.13	A, XII.
A, 1172.....	8	19	31	3	1.01	30	52.6	0.13	A, XII.
P.XIX, 211.....	6	19	31	6	1.57	39	1.8	0.13	IX.
A, 1174.....	7	19	31	12	0.95	30	6.8	0.13	A, XII.
W.B.(2)XIX.956	8	19	31	44	2.71	73	48.7	0.13	IX.
BR. 2496.....	7	19	32	35	1.61	40	2.5	0.13	XII, VII, (VII).
BR. 2488.....	6	19	32	36	3.62	113	42.8	0.13	(VII).
LL. 37358.....	7½	19	33	10±	1.61	40	2.5	0.13	A, XII.
GR. 2899.....	5.6	19	33	27	0.65	26	50.6	0.13	IX.
(VII), 2165.....	Var	19	33	28	1.61	40	4.9	0.13	(VII).
(VII), 2166.....	9	19	33	30	1.61	40	3.4	0.13	(VII).
A, 1176.....	...	19	33	36	3.44	106	34.1	0.13	A, XII.
RUEMKER, 7742 .	8	19	33	58	2.68	72	13.3	0.13	VI.
P.XIX, 233.....	5.6	19	34	29	+1.69	41	0.3	0.13	VII.
GR. 2917.....	6	19	35	40	—0.54	18	40.4	0.14	VII, (VII), IX.
VII, 1590	....	19	35	44	+3.42	105	38.7	0.13	VII.
GR. 2907	5	19	35	53	1.35	35	19.1	0.14	VII.
W.B.XIX, 895.	8.9	19	36	4	3.21	96	46.2	0.13	VI.
BR. 2502.....	7	19	36	45	2.68	71	49.7	0.14	IX.
P.XIX, 237.....	6.7	19	37	29	3.81	121	12.1	0.13	VII, (VII), IX.
P.XIX, 243.....	5.6	19	38	2	3.84	122	12.4	0.14	XII, VI, VII.
16 c^1 Cygni...	6.5	19	38	30	1.61	39	45.7	0.14	A, XII, VII.
16 c^2 Cygni...		19	38	33	1.61	39	46.2	0.14	A, XII, VII.
VI, 1283.....	....	19	38	37	3.23	96	56.3	0.14	VI.
BR. 2507.....	7	19	38	47	2.80	77	4.1	0.14	(VII).
BR. 2510.....	6	19	38	49	2.50	68	9.8	0.14	(VII).
W. XIX, 1002...	9	19	40	12	3.03	87	26.6	0.14	A, XII.
(VII), 2178.....	....	19	40	13	+3.74	118	41.3	—0.14	(VII).

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GR. 2935.....	5	19	40	48	+1.16	32	17.1	−0.14	VII.
VII, 1601.....	....	19	41	20	3.74	118	43.2	0.14	VII.
17 χ^1 Cygni..... (1st star).	5.6	19	41	41	2.28	56	33.7	0.14	(VII).
17 Cygni .. .... (3d star).	....	19	41	43	2.28	56	33.6	0.14	(VII), IX.
LL 37692	6 7	19	41	48	2.30	57	25.1	0.14	(VII).
BR. 2515.....	6	19	42	9	3.32	101	10.9	0.14	A, XII.
IX, 1814.....	10	19	42	33	2.46	62	59.3	0.14	IX.
LL. 37653.....	7	19	42	42	3.69	117	1.7	0.14	VII, (VII).
LL. 37730... ...	6.7	19	42	58	2.45	62	36.4	0.15	IX.
BR. 2521.....	7.8	19	43	0	2.84	78	37.6	0.14	(VII).
S Volpeculae...	Var	19	43	16	2.46	63	1.5	0.15	A, XII, IX.
LAC. 8243	7	19	43	28	+3.71	117	47.3	0.14	VII, (VII),
GR. 2948.....	8.9	19	43	30±	−0.07	20	57.3	0.15	IX.
LL. 37707.....	7	19	43	59	+3.70	117	23.9	0.15	VII, (VII).
GR. 2952.....	6	19	44	29	−0.06	20	58.1	0.15	(VII), IX.
(VII), 2188.....	....	19	44	33	+2.89	81	25.9	0.15	(VII).
GR. 2946.....	7	19	45	0±	1.25	33	23.8	0.15	XII.
BR. 2529.....	6	19	45	2	2.13	51	36.2	0.15	(VII).
W. B. XIX,1129	7	19	45	18	2.88	80	41.2	0.15	IX.
VII, 1611.....	....	19	45	21	3.50	109	41.5	0.15	VII.
(VII), 2195.....	....	19	45	48	2.31	57	26.2	0.15	(VII).
VII, 1613.....	...	19	45	55	3.50	109	35.1	0.15	VII.
(VII), 2196.....	....	19	45	55	2.31	57	21.6	0.15	(VII).
(VII), 2198.....	...	19	46	1	2.31	57	21.6	0.15	(VII).
(VII), 2199.....	....	19	46	9	2.31	57	26.3	0.15	(VII).
GR. 2950.....	6	19	46	20	2.66	49	43.0	0.15	A, XII, VII,
(VII), 2201.....	....	19	46	25	2.31	57	23.8	0.15	(VII).
P. XIX, 302	6	19	47	4	+3.86	123	22.2	−0.15	XII, VI,

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P. XIX, 314....	7	19	47	52	+3.25	98	33.7	−0.15	(VII.)
GR. 2968.....	6	19	48	26	+0.94	29	6.8	0.15	IX.
63 ε Draconis. (N. Star.)	4	19	48	35	−0.18	20	3.1	0.15	(VII).
63 ε Draconis. (S. Star.)		19	48	35	−0.18	20	3.1	0.15	(VII).
BR. 2541.....	6	19	49	13	+2.55	66	0.5	0.15	(VII).
LL. 38033.....	8	19	49	56	2.14	51	50.8	0.15	IX.
XII, 1788.....	....	19	51	20±	2.82	78	9,5	0.15	XII.
24 ψ Cygni... (N. Star.)	5	19	52	24	1.56	37	53.8	0.16	IX.
24 ψ Cygni... (S. Star.)		19	52	24	1.56	37	53.9	0.16	IX.
BR. 2546.....	7.8	19	52	33	2.74	73	50.4	0.16	(VII).
GR. 2992.... ...	6	19	52	41	0.99	29	30.4	0.16	IX.
GR. 2993.....	6	19	52	45	1.01	29	43.0	0.16	IX.
GR. 2984.....	5	19	52	53	2.08	49	58.0	0.16	VII.
W. XIX, 1300..	6.7	19	53	0	3.29	100	16.7	0.16	XII.
GR. 2990.....	6	19	53	20	1.64	39	25.9	0.16	XII.
P. XIX, 371....	6.5	19	53	33	1.17	31	29.2	0.16	A, XII.
P. XIX, 351....	6	19	53	58	3.58	113	4.7	0.16	IX.
OE. A. 20155....	9	19	54	5	3.43	106	54.3	0.16	(VII).
LL. 38199	6	19	54	56	2.90	81	47.1	0.16	XII.
LL. 38283.....	7	19	56	8	2.22	53	45.2	0.16	IX.
P. XIX, 366	5	19	56	24	3.84	122	24.3	0.16	A, XII, VII.
BR. 2559.....	5	19	56	27	2.54	65	32.8	0.16	VII.
ARG. Zone +36°. No. 3820.	6.7	19	56	40	2.20	53	14.9	0.16	IX.
GR. 3019.....	6	19	56	55	0.76	26	48.4	0.16	IX.
LL. 38262.....	7	19	57	34	3.67	117	9.9	0.16	VII.
P. XIX, 377....	6	19	57	37	3.54	111	39.9	0.16	VII.
VII, 1634.....	....	19	57	52	1.70	40	15.2	0.16	VII.
BR. 2567.....	6.7	19	58	19	+2.72	73	13.7	−0.16	(VII).

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P. XX, 1.....	7	20	0	51	+0.67	25	41.6	—0.17	VI.
LAC. 8359	7	20	1	30	3.65	116	34.9	0.17	XII, VII.
P. XXI, 410....	7.8	20	2	15	3.51	110	57.3	0.16	(VII).
GR. 3041	6	20	2	31	1.37	34	1.2	0.17	XII.
LL. 38498.	7	20	2	34	3.63	115	38.9	0.17	VII, (VII).
GR. 3042.	6.5	20	2	56	1.59	37	12.2	0.17	IX.
GR. 3051.....	6	20	3	10	0.77	26	28.2	0.17	IX.
(VII), 2243.....	....	20	3	11	3.41	106	10.5	0.17	(VII).
(VII), 2244.....	....	20	3	14	3.41	106	19.8	0.17	(VII), IX.
BR. 2574.	8	20	3	17	2.61	68	12.5	0.17	(VII).
XII, 1802.....	...	20	4	10±	2.76	74	35.9	0.17	XII.
LL. 38631.....	8	20	4	22	2.64	69	28.2	0.17	(VII).
BR. 2581	7	20	5	33	2.64	69	14.1	0.18	(VII).
P. XX, 36.....	9	20	6	44	2.51	63	37.7	0.18	IX.
LL. (F). 3384 ...	7	20	6	58	0.96	28	17.5	0.18	A, XII, IX.
P. XX, 29.....	6	20	7	29	3.76	117	24.2	0.17	VII, IX.
LAC. 8386.....	7	20	8	.4	3.74	120	23.1	0.18	VII, (VII), IX.
R Sagittae	Var	20	8	21	2.74	73	39.1	0.18	VII, (VII), IX.
XII, 1809.....	....	20	8	42	+2.74	73	37.9	0.18	XII, VII, IX.
LL. 39147	8	20	8	51	—2.92	10	49.9	0.18	IX.
GR. 3087.....	6	20	9	3	+1.67	38	54.7	0.18	VII.
XII, 1810.....	....	20	9	11	2.74	73	36.3	0.18	XII, VII.
VII, 1651.....	....	20	9	28	2.74	73	37.8	0.18	VII.
GR. 3088.....	6	20	9	30	2.02	47	0.0	0.18	VII.
XII, 1811.....	....	20	9	30±	2.74	73	36.4	0.18	XII.
P. XX, 63.....	7.8	20	9	43	1.89	43	39.9	0.18	A, XII VII, (VII).
LL. 38866.....	5	20	9	58	2.54	64	47.3	0.18	VII.
BR. 2599.....	7.8	20	9	59	+ 2.24	53	37.6	—0.18	(VII).

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Br. 2615.....	6	20	11	10	+1.13	29	44.2	—0.18	IX.
Br. 2605.....	7	20	11	16	+2.49	62	36.5	0.18	(VII).
P. XX, 119.....	7.8	20	12	15	—2.07	12	32.9	0.18	A, XII, (VII).
Ll. 38947.....	7	20	12	17	+3.61	115	36.8	0.18	VII, (VII).
IX, 1882.....	....	20	12	18	3.50	110	18.0	0.18	IX.
Br. 2613.... ...	5.6	20	12	29	2.15	50	1.3	0.18	(VII).
IX, 1883.....	....	20	12	40	3.49	110	18.0	0.18	IX.
Br. 2620.....	7	20	12	40	+0.78	25	37.2	0.18	(VII).
VII, 1669	....	20	13	6	—1.88	12	40.1	0.18	VII.
VI, 1311.....	8	20	13	26	+3.09	91	2.8	0.18	VI.
Br. 2613..... .	5.6	20	13	42	2.22	49	39.4	0.18	(VII).
P. XX, 79.....	6.7	20	13	45	3.38	105	10.7	0.18	XII, VI, VII, (VII).
Ll. 39124.....	9	20	14	1	1.71	39	14.3	0.18	IX.
Br. 2621.....	....	20	14	57	1.79	40	53.5	0.19	(VII).
Br. 2619.....	7	20	15	8	2.23	53	15.5	0.19	(VII).
XII, 1826.....	....	20	15	20±	1.49	34	59 4	0.19	XII.
Gr. 3142.....	7.8	20	15	20±	1.49	34	59.4	0.19	XII.
Gr. 3140.....	6	20	15	43	2.17	50	59.4	0.19	VII, (VII), IX.
Gr. 3145.....	7.8	20	15	50	1.48	34	50.8	0.19	XII.
Gr. 3150.....	6	20	16	16	0.53	23	32.9	0.19	(VII), IX.
Lac. 8427	7	20	17	2	3.70	119	28.7	0.19	VII, (VII), IX.
Ll. 39153.....	7	20	17	6	+3.62	116	14.1	0.19	VII.
Gr. 3212.....	6.7	20	17	23	—7.99	5	42.0	0.19	IX.
IX, 1891.....	7.8	20	17	28	+3.69	119	15.8	0.19	IX.
Lac. 8433.....	6.7	20	17	48	3.69	119	4.1	0.19	VII, (VII), IX.
Lac. 8440.....	7	20	18	16	3.63	116	57.6	0.19	(VII).
Gr. 3154.....	5	20	18	19	+2.13	49	22.4	—0.19	VII.

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Lac. 8442.....	7	20	18	52	+3.70	119	28.8	—0.19	VII, (VII), IX.
Br. 2636.....	6	20	19	32	0.29	21	31.1	0.19	IX.
W.B.XX, 465..	7.8	20	19	43	+2.89	80	20.9	0.19	IX.
Gr.3402...	5	20	19	46	—47.12	1	14.9	0.20	(VII).
Lac. 8451.....	7	20	20	18	+3.67	118	40.2	0.19	VI.
Lac. 8452.....	7	20	20	25	3.70	119	47.0	0.19	XII, VI.
Ll. 39324	7	20	21	4	3.57	114	34.3	0.19	VII, (VII).
Gr.3172.....	6	20	21	5	2.08	47	48.2	0.19	VI.
Lac. 8459.....	7	20	21	20	3.57	114	23.6	0.19	VII, (VII).
Br. 2627	7	20	21	52	3.44	108	17.1	0.19	A, XII, VI, (VII).
Ll. 39408.....	7.8	20	21	52	2.44	60	2.4	0.19	IX.
P. XX, 146.....	6	20	22	11	3.53	112	48.2	0.19	VII, IX.
Br. 2630.....	7.7	20	22	43	3.45	108	59.9	0.19	(VII).
Lac. 8466.....	6.7	20	23	17	3.69	119	31.7	0.20	VII, (VII), IX.
Br. 2641.....	7	20	24	39	1.85	41	29.7	0.20	(VII).
P.XX, 165.....	8	20	24	52	3.58	115	17.4	0.20	VII, (VII), IX.
P.XX, 186.....	8	20	25	2	1.84	41	9.0	0.20	VII, (VII.)
Br. 2638.....	7.8	20	25	14	2.83	79	9.5	0.20	(VII).
P.XX, 177	8.9	20	25	14	2.87	79	9.6	0.20	(VII.)
P.XX, 170.....	6	20	25	26	3.57	115	21.8	0.20	VII, IX.
W.B.XX, 621 ..	8	20	26	9	3.23	98	21.1	0.20	(VII.)
Br. 2655.....	7	20	26	37	0.40	21	38.7	0.20	VI.
Oe. A. 29713....	9	20	28	24	1.27	30	32.9	0.20	A, XII, VI.
P.XX, 194.....	6	20	28	26	3.40	106	57±	0.20	XII.
A, 1231.....	9	20	28	37	1.28	30	41±	0.20	A, XII.
VII, 1693.....	....	20	29	26	3.42	107	57.7	0.20	VII, (VII).
VII, 1694.....	....	20	29	32	+3.42	108	1.1	— 0.20	VII, (VII).

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VII, 1696	....	20 30 8	+3.42	108 6.2	—0.20	VII, (VII).
VII, 1697	....	20 30 17	+3.42	107 54.6	0.20	VII.
BR. 2673	6	20 30 32	−0.21	17 53.5	0.20	(VII), IX.
XII, 1842	....	20 30 44	+1.28	30 33±	0.20	XII.
A, 1233	....	20 30 51	1.28	30 31.5	0.20	A, XII.
P. XX, 265	6	20 32 9	0.18	19 53.8	0.20	IX.
A, 1235	....	20 32 19	3.43	108 35±	0.20	A.
W. B, XX, 803	8	20 32 26	2.83	77 6.5	0.21	(VII.)
BR. 2666	....	20 32 28	2.43	58 54.7	0.21	(VII.)
BR. 2659	7	20 32 43	3.13	92 51.1	0.21	IX.
BR. 2667	7	20 33 17	2.78	74 36.0	0.21	XII, VI, VII, IX.
BR. 2669	7	20 33 53	2.90	79 11.6	0.21	(VII).
LAC. 8532	6½	20 33 56	+3.60	116 26.4	0.21	XII, VI.
BR. 2701	7	20 34 38	−3.50	8 59.6	0.21	XII, (VII), IX.
BR. 2671	8	20 34 46	+2.79	74 49.1	0.21	IX.
LL. 39944	...	20 34 51	2.81	75 54.9	0.21	VI.
BR. 2674	7	20 35 10	2.02	44 46.5	0.21	(VII).
(VII), 2345	Var	20 39 34	2.78	74 3.3	0.21	(VII).
GR. 3274	6	20 40 0	1.29	29 51.0	0.21	IX.
12 γ^1 Delphini	7	20 40 51	+2.78	74 19.6	0.21	VI, IX.
BR. 2711	7	20 40 51	−2.20	11 0.7	0.22	A, XII.
12 γ^2 Delphini	3.4	20 40 52	+2.78	74 19.6	0.21	VI.
P. XX, 298	6	20 41 4	3.51	113 11.6	0.21	IX.
B. F. 2827	6	20 41 19	3.42	108 39.4	0.22	IX.
LL. 40125	8	20 41 20	3.42	108 39.5	0.22	IX.
W. XX, 1023	7.8	20 41 21	+3.26	100 13±	0.21	XII.
RADCLIFFE 4976.	6.7	20 41 23	−5.46	6 48.6	0.22	IX.
P. XX, 310	6.7	20 42 15	+3.41	108 29.7	−0.22	IX.

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P. XX, 332	5	20	42	15	1.50	32	52.1	0.21	A, XII, VII.
P. XX, 325	6½	20	43	48	3.32	103	0±	0.22	XII.
P. XX, 339	6	20	45	41	3.54	114	15.0	0.22	VII, IX.
XII, 1870	....	20	46	39	1.42	31	13±	0.22	XII.
GR. 3313	8	20	47	34	1.92	40	48.8	0.22	VII.
A, 1249	....	20	47	40±	1.43	31	12.0	0.22	A, XII.
LL. 40436	9	20	47	45	1.92	40	46.4	0.22	VII.
RUEMKER 8658	9	20	47	54	1.43	31	10.5	0.22	A, XII, VI.
BR. 2712	7.8	20	49	28	2.13	46	5.2	0.23	(VII).
P. XX, 391	7	20	49	44	1.73	35	57.7	0.23	(VII), IX.
GR. 3327	8	20	49	50	1.94	40	56.4	0.23	VII.
VII, 1725	....	20	51	12	3.38	107	10.4	0.23	VII.
P. XX, 401	7.8	20	51	32	2.13	46	6.3	0.23	IX.
BR. 2720	6	20	51	37	2.02	43	3.7	0.23	VII, (VII), IX.
BR. 2725	7	20	52	20	1.96	41	17.0	0.23	IX.
1 Equulei (1st star.)	5	20	52	50	3.00	86	11.1½	0.23	(VII).
1 Equulei (2nd star.)	5	20	52	50	3.00	86	11.0	0.23	(VII).
BR. 2727	5	20	52	56	+1.61	33	35.5	0.23	A, XII, VII.
BR. 2749	6	20	53	12	−2.49	9	55.0	0.23	A. XII, VII, (VII), IX.
BR. 2726	....	20	53	51	+2.15	46	0.9	0.23	(VII).
P. XX. 429 (1st star).	....	20	54	30	1.92	40	1.4	0.23	IX.
P. XX, 429 (as one mass).	6	20	54	30	1.92	40	1.3	0.23	IX.
P. XX. 429 (2 d star)	....	20	54	30	1.92	40	1.3	0.23	IX.
GR. 3357	6	20	55	9	2.27	50	14.1	0.23	IX.
(VII), 2376	....	20	55	34	2.04	42	57.6	0.23	(VII).
2 Equulei (1st star)	....	20	56	2	2.96	83	18.7	0.23	(VII).
2 Equulei (as one mass).	6	20	56	3	2.96	83	18.7	0.23	(VII).
2 Equulei (2nd star)	....	20	56	3	+2.96	83	18.7	−0.23	(VII).

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BR. 2748.....	6	20	56	11	−0.62	14	33.5	−0.23	VI, VII, (VII), IX.
BR. 2738.....	6	20	56	20	+1.48	31	2.9	0.23	IX.
P. XX, 452.....	6	20	57	33	2.30	50	59.0	0.23	IX.
P. XX, 443	7.8	20	57	50	+3.38	107	39.6	0.23	VII.
VII, 1738.....	....	20	57	59	−2.38	9	54.2	0.23	VII.
LL. 41059.....	9.10	20	58	2	−2.33	9	59.2	0.23	(VII).
BR. 2740.....	6.7	20	58	14	+2.32	51	50.2	0.23	(VII).
R Vulpeculae...	Var	20	58	50	2.66	66	40.4	0.24	(VII), IX.
(VII), 2389.....	9.10	20	58	55	2.66	66	40.3	0.23	(VII).
P. XX, 465.	6	20	59	11	2.25	48	51.9	0.23	IX.
BR. 2736	7	20	59	34	3.44	110	40.7	0.24	(VII).
61 Cygni..... (1st star).	5.6	21	1	18	2.67	51	51.8	0.29	A, XII, VI, VII, (VII). IX.
61 Cygni ..... (2d star).	6	21	1	19	2.68	51	52.0	0.29	A, XII, VI, VII, (VII), IX.
LL. (F.) 3689....	7	21	1	34	1.46	30	14.5	0.24	(VII).
P. XXI, 1... ...	6	21	3	21	2.54	60	17.9	0.24	IX.
LL. 41000.....	8½	21	3	23	3.37	107	27.8	0.24	VI.
BR. 2755	8	21	4	53	2.70	68	3.1	0.24	(VII.)
BR. 2756.....	8	21	4	54	2.70	68	3.3	0.24	(VII).
VII, 1747.....	....	21	5	8	3.35	106	33.1	0.24	VII.
GR. 3409	6	21	5	38	0 41	19	4.2	0.24	IX.
VII, 1748	....	21	5	56	3.37	107	41.4	0.24	VII.
BR. 2757...	8	21	6	19	2.69	67	25.8	0.24	(VII).
P. XXI, 32	6	21	6	24	1.86	36	56.8	0.24	IX.
LL. (F.) 3721....	7.8	21	7	13	1.51	30	18.6	0.24	(VII), IX.
A, 1269	8	21	8	21	1.62	32	3.2	0.24	A, XII.
GR. 3415.....	6.7	21	8	37	1.54	30	31.5	0.25	XII, VII.
VII, 1754	....	21	9	26	+3.34	106	22.7	−0.25	VII, (VII).

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P. XXI, 61.....	6	21	9	36	+1.55	30	25.0	−0.25	(VII.)
A {1273..... 1274.....}	...	21	9	47	1.63	32	5.3	0.25	A, XII.
A, 1275.....	....	21	9	58	+1.63	32	1.3	0.25	A, XII.
Gr. 3426.... ...	6	21	10	14	−0.23	15	17.0	0.25	IX.
W. B. XXI, 198..	8.9	21	10	32	+3.00	85	16.0	0.25	VI, VII.
Ll. 41317.....	9	21	10	55	3.34	106	24.6	0.25	VII.
Ll. 41419.....	7	21	12	41	2.36	51	18.7	0.25	IX.
Armagh 4618...	9	21	13	14	2.36	51	10.2	0.25	IX.
P. XXI, 86.....	5.6	21	13	30	1.80	34	43.5	0.25	(VII.)
Ll. 41445.....	8.9	21	14	35	3.32	105	41.0	0.25	VII, (VII).
VII, 1762.....	....	21	15	2	3.32	105	37.4	0.25	VII, (VII.)
(VII), 2420.....	Var	21	15	7	3.32	105	41.3	0.25	(VII).
Gr. 3432	6	21	15	11	2.06	41	1.0	0.25	VII.
Br. 2773.....	7	21	15	16	3.23	99	51.4	0.25	VII, (VII).
Or. A. (N.) 22066	6	21	15	48	1.66	31	54.2	0.25	IX.
VI, 1369.....	....	21	15	51	0.52	18	58.6	0.25	VI.
Gr. 3435.....	6.5	21	16	0	2.07	41	10.6	0.25	VII.
Gr. 3441.....	6	21	17	40	2.08	41	8.8	0.25	VII.
VI, 1370.....	....	21	18	1	3.11	92	45.9	0.25	VI.
Gr. 3447.....	7.8	21	18	9	2.08	41	2.6	0.25	VII.
VI, 1371.... ...	....	21	18	20±	3.11	92	45.6	0.25	VI.
P. XXI, 114....	6	21	18	21	2.71	66	15.7	0.26	IX.
Gr. 3450.....	9	21	18	33	2.08	41	9.4	0.25	VII.
W. B. XXI, 400.	9	21	18	38	3.11	92	50.5	0.26	VI.
P. XXI, 120.....	6	21	19	1	2.65	64	21.8	0.25	VII, (VII).
P. XXI, 142.....	6	21	19	48	1.34	26	18.5	0.26	(VII), IX.
Gr. 3457.....	9	21	20	26	2.09	41	8.7	0.26	VII.
Br. 2792.....	6	21	20	44	+2.18	43	49.5	−0.26	(VII).

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P. XXI, 157.....	6½	21	22	55	+2.20	44	7.5	—0.26	XII, VI.
P. XXI, 159.....	6.7	21	23	19	2.20	43	58.9	0.26	A, XII.
Br. 2832.	7	21	23	30	—4.60	6	16.3	0.26	(VII).
Gr. 3548.....	6	21	24	12	—10.70	3	29.1	0.26	VI, (VII), IX.
VI, 1376	....	21	24	33	+3.01	85	28.9	0.26	VI.
71 g^1 Cygni.....	5	21	24	50	2.20	44	0.6	0.26	VII.
g^2 Cygni	...	21	24	55	2.20	44	0.8	0.26	VII.
Ll. 41897.....	8	21	25	0	2.21	44	7.3	0.26	A, XII, IX.
W. B. XXI, 571 .	8	21	25	40	3.00	85	15.4	0.26	VI.
XII, 1910.....	....	21	26	0±	2.21	44	0.8	0.26	XII.
A, 1284.....	8.9	21	26	8	1.80	33	6.4	0.26	A, XII.
Ruemker 9246..	8	21	26	27	2.85	74	47.1	0.26	XII, VI.
8 β^1 Cephei.....	...	21	27	0	0.80	19	59.4	0.26	VI, VII, (VII).
8 β^2 Cephei.....	3	21	27	2	0.80	19	59.3	0.26	VI, VII, (VII).
Gr. 3485.....	6	21	27	4	2.03	38	21.4	0.26	(VII).
Gr. 3489.....	5	21	27	34	1.65	30	5.5	0.26	VII,
W. B. XXI, 630.	8.9	21	27	42	2.85	74	58.3	0.26	XII, VI.
Oe, A. (N), 22411	6	21	27	47	2.16	42	6.4	0.26	IX.
Gr. 3492.....	8	21	27	53	1.81	33	2.0	0.26	A, XII, VI.
W. XXI, 637...	8	21	27	54	2.85	74	52.1	0.26	A, XII, VI.
Br. 2804.....	7.8	21	28	21	+3.05	88	43.5	0.26	IX.
Gr. 3511.....	5.6	21	28	28	—1.45	10	1.1	0.27	VII, (VII), IX.
Br. 2807	7	21	28	37	+2.24	44	42.0	0.26	(VII).
Gr. 3494.....	8	21	28	44	+1.81	33	1.0	0.26	XII, VI.
Gr. 3508.....	5.6	21	28	59	—0.18	14	8.8	0.26	VII, (VII), IX,
Gr. 3503	6	21	29	22	+0·80	19	43.7	0.25	IX.
A, 1290.	....	21	29	44	1.82	33	3±	0.27	A.
Gr. 3510.... ...	8.9	21	31	53	+ 1.84	33	5.3	—0.27	XII, VI.

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VI, 1392	....	21	32	10±	+1.83	33	0.6	—0.27	VI.
GR. 3513	9	21	32	12	1.84	33	5.2	0.27	XII, VI.
VI, 1389	....	21	32	50±	1.83	33	2.7	0.27	VI.
W. B. XXI, 755.	8	21	32	53	2.94	80	40.3	0.27	VI.
XII, 1927	8	21	33	0±	1.84	32	58.5	0.27	XII.
LL. 42191	8.9	21	33	17	3.01	85	18.2	0.27	VII, (VII).
P. XXI, 241	6	21	33	51	1.62	28	15.7	0.27	(VII.)
XII, 1929	8.9	21	34	0±	1.85	33	0.1	0.27	XII.
GR. 3524	7	21	34	0	2.15	40	46.1	0.27	VII.
W. XXI, 791	9	21	34	2	3.12	93	4.9	0.27	XII.
OE. A. {22641 22642}	8.9	21	35	0±	1.86	33	4.2	0.27	VI.
P. XXI, 248	6.5	21	35	5	1.86	33	4.5	0.27	VI.
OE. A. 22648	9	21	35	10±	1.86	33	4.6	0.27	VI.
VII, 1736	....	21	35	12	2.34	47	17.8	0.27	VII, (VII).
GR. 3537	6	21	35	41	2.16	40	53.1	0.27	VII.
RADCLIFFE 5352	7.8	21	35	49	2.01	36	35.8	0.27	(VII.)
P. XXI, 243	6	21	36	14	3.36	110	11.4	0.27	IX.
BR. 2827	6	21	36	26	2.94	79	44.7	0.27	IX.
A, 1296	8.9	21	37	5	1.89	33	26.0	0.27	A, XII.
BR. 2854	7	21	37	25	0.87	19	15.3	0.27	(VII), IX.
BR. 2829	8	21	37	27	3.30	106	32.5	0.27	IX.
VII, 1802	....	21	37	54	3.30	105	56.8	0.27	VII.
W. B. XXI, 896.	8.9	21	37	57	2.94	80	39.9	0.27	VI.
BR. 2841	6	21	38	5	2.40	49	24.9	0.27	(VII.)
GR. 3556	7	21	38	6	2.18	40	58.3	0.27	VII.
W.B.(2) XXI, 923	8	21	38	6	2.48	52	33.2	0.27	IX.
BR. 2833	7.8	21	38	15	3.21	99	36.6	0.27	(VII.)
LL. 42406	7	21	38	26	+2.47	52	16.1	—0.27	A, XII.

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78 μ^1 Cygni..	4.5	21	38	32	+2.65	61	49.2	−0.27	A, XII, VII, (VII).
78 μ^2 Cygni..		21	38	33	2.65	61	49.3	0.27	A, XII, VII, (VII).
P. XXI, 267	8	21	38	47	2.66	61	47.5	0.27	A, XII.
W. B. XXI, 935.	9	21	39	51	2.95	81	5.1	0.27	VI.
Br. 2851.....	7	21	40	17	2.72	64	59.5	0.27	(VII).
Br. 2852.....	7	21	40	42	2.73	65	0.9	0.27	(VII).
Br. 2853.....	7.8	21	41	8	2.86	73	23.0	0.27	(VII).
Oe. A. 22879...	8.9	21	42	41	1.07	20	35.6	0.28	XII, VI.
Gr. 3571.....	6	21	43	8	2.48	51	37.5	0.28	IX.
Gr. 3577.....	8.9	21	44	27	2.21	40	54.2	0.28	VII.
VI, 1406.....	....	21	44	33	1.08	20	30.3	0.28	VI, VII, (VII).
Oe. A. 22927....	9	21	44	42	1.10	20	36±	0.28	XII, VI.
Gr. 3590.....	6.7	21	44	49	1.09	20	25.7	0.28	A, XII, VI VII, (VII) IX.
VI, 1408.....	....	21	44	49	1.10	20	34.9	0.28	VI.
Ll. 42611.....	8	21	45	2	2.67	61	48.9	0.28	VI.
Gr. 3588.....	6	21	45	6	1.51	25	24.7	0.28	IX.
VII, 1821.....	....	21	45	14	1.09	20	28.6	0.28	VII.
Br. 2865.....	7	21	45	40	1.75	29	18.5	0.28	XII, VI.
A, 1311.....	....	21	45	45	1.43	24	13±	0.28	A, XII.
VI, 1412.....	....	21	46	28	1.46	24	31.1	0.28	VI.
Gr. 3594.....	7.8	21	46	36	1.52	25	21.1	0.28	IX.
XII, 1955.....	....	21	46	37	1.44	24	10.8	0.28	XII, VI.
XII, 1956 :.....	....	21	46	40±	1.44	24	12.3	0.28	XII.
VI, 1414	....	21	46	50±	1.46	24	30.9	0.28	VI.
VI, 1416.....	....	21	46	59	1.46	24	26.8	0.28	VI, VII.
VI, 1417.....	....	21	47	14	1.48	24	41.7	0.28	VI, VII.
P. XXI, 820.....	6	21	47	39	3.14	94	51.9	0.27	VII.
Gr. 3596.....	7	21	47	47	+2.02	34	47.8	−0.28	IX.

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Br. 2866	6	21 47 47	+2.02	34 47.4	—0.28	IX.
Br. 2868.....	6	21 48 54	2.02	34 22.6	0.28	A, XII.
Br. 2867.....	7	21 48 57	2.10	36 35.5	0.28	(VII).
P. XXI, 333.....	8	21 50 9	3 33	109 47.0	0.28	XII.
Br. 2876.....	7	21 50 30	0.89	18 6.0	0.28	(VII).
Br. 2871.....	6	21 50 33	2.14	36 39.6	0.28	(VII).
Gr. 3616.... ...	8.9	21 50 34	1.79	29 6.6	0.28	IX.
Gr. 3621.....	6	21 51 36	1.79	29 3.1	0.28	IX.
P. XXI, 344.....	7	21 51 40	3.24	103 15.8	0.28	XII.
Br. 2870.....	6.7	21 51 40	3.15	96 1.0	0.28	(VII).
Ll. 42837.....	7	21 52 37	3.47	119 13.0	0.28	VII, (VII).
Ruemker 9704..	....	21 52 53	2.93	78 24.3	0.28	VI, VII, (VII).
P. XXI, 360....	6.5	21 53 8	1.70	26 58.2	0.28	VI, VII, IX.
Ll. 42883.....	7	21 53 10	+2.69	60 46.2	0.28	VII.
Br. 2894.....	6.7	21 53 32	—0.53	11 2.5	0.28	(VII).
Ll. 42919.....	9.10	21 55 5	+3.27	105 59.8	0.29	VII, (VII).
Br. 2884.....	6.7	21 55 12	2.02	32 56.3	0.29	(VII).
29 Aquarii..... (1st star).	7	21 55 35	2.92	107 33.9	0.29	VI, VII, (VII), IX.
29 Aquarii..... (As one mass).	6	21 55 36	3.29	107 33.8	0.29	VII.
29 Aquarii ..... (2nd star).	7	21 55 36	3.29	107 33.8	0.29	VI, VII, (VII), IX.
A, 1316.....	....	21 55 49	2.08	34 58.7	0.29	A, XII.
Ruemker 9773..	....	21 55 54	+2.08	35 0.8	0.29	A, XII, VI.
Gr. 3667.....	6	21 56 13	—0.71	10 17.2	0.29	IX.
Br. 2897.....	6.7	21 56 38	+0.62	15 36.0	0.29	IX.
VI, 1427.....	....	21 56 40±	2.09	34 58.8	0.29	VI.
VI, 1428.... ...	....	21 56 50±	2.09	35 0.9	0.29	VI.
P. XXI, 383.....	6½	21 57 16	2.21	37 43.1	0.29	XII.
Br. 2886	8	21 58 3	+3.14	95 26.7	—0.29	(VII).

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BR. 2888.....	7	21	59	32	+3.14	95	57.7	−0.29	(VII).
ξ^1 Cephei.....	7	22	0	9	1.74	25	58.8	0.29	A,XII,VI VII,(VII) IX.
17 ξ^2 Cephei	5	22	0	10	1.74	25	58.8	0.29	A,XII,VI VII,(VII) IX.
GR. 3680.....	6.7	22	0	57	2.34	42	22.5	0.29	IX.
P. XXI, 405....	6	22	0	58	2.40	45	35.5	0.29	VII.
BR. 2896	7.8	22	1	8	+3.15	96	26.3	0.29	(VII.)
GR. 3707.....	7	22	2	36	−1.75	7	43.9	0.29	(VII), IX.
BR. 2935.	6	22	2	43	−1.73	7	43.9	0.29	(VII), IX.
BR. 2904.....	7.8	22	2	54	+3.18	98	8.6	0.29	(VII), IX.
P. XXII, 4.....	6½	22	2	58	2.03	31	46.2	0.29	XII.
A, 1330.....	....	22	3	10±	2.13	34	42.3	0.29	A.
A { 1328..... 1331..... }	...	22	3	30	2.13	34	40.1	0.29	A, XII.
OE. A. 23477....	9	22	3	30	2.16	35	40.0	0.29	A, XII, VI.
XII, 1982.....	....	22	3	30	2.13	34	42.3	0.29	XII, VI.
VI, 1439.....	8	22	3	30±	2.11	34	2.1	0.29	VI.
GR. 3693..... ..	8	22	3	34	2.11	34	2.0	0.29	VI, VII.
XII, 1980	....	22	3	34	2.10	33	50±	0.29	XII.
A, 1332	....	22	3	35	2.13	34	39±	0.29	A.
GR. 3692.....	6	22	3	44	2.36	42	40.7	0.29	XII.
BR. 2912.....	6	22	3	51	3.13	94	30.3	0.29	(VII).
BR. 2913.....	6.7	22	4	3	3.13	94	52.8	0.29	(VII).
OE. A. { 23506. 23507. }	8.9	22	4	16	2.13	34	34.9	0.29	A, XII, VI.
VI, 1441.....	....	22	4	21	2.11	33	54.5	0.29	VI, VII, (VII).
P. XXII, 11....	6	22	4	22	2.02	31	19.1	0.29	(VII).
P. XXII, 12 ...	6.7	22	4	24	2.01	31	19.4	0.29	(VII).
P. XXII, 8.....	7	22	4	35	2.48	47	25.6	0.29	VII.
OE. A. { 23522. 23523. }	9	22	4	42	+2.10	33	34.0	−0.29	XII, VI.

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P. XXII, 16....	6.7	22	4	45	+2.05	31	45.7	—0.29	(VII), IX.
Oe. A. 23534....	8.9	22	4	51	2.13	34	25.4	0.29	A, XII, VI.
VI, 1444.....	....	22	5	20	2.11	33	54.6	0.29	VI.
Gr. 3699.....	7	22	5	36	2.38	42	42.1	0.29	XII.
Br. 2918.....	7	22	5	37	3.23	101	40.9	0.29	(VII).
Oe. A. {23565. 23566.}	7.8	22	5	42	2.14	34	32.0	0.29	XII, VI.
P. XXII, 15....	6	22	5	49	2.90	74	34.5	0.29	IX.
Br. 2920.....	6	22	6	13	3.13	95	20.2	0.29	(VII).
Gr. 3703.....	5	22	6	18	2.31	39	47.6	0.30	VII.
Br. 2926.....	6	22	7	18	2.15	33	46.9	0.30	A, XII, VI.
Br. 2924.....	7	22	7	21	3.14	95	4.2	0.29	(VII).
Gr. 3714.....	7.8	22	7	46	2.19	35	31.3	0.29	A, XII.
Gr. 3719.....	6	22	7	48	1.42	20	29.1	0.30	IX.
Br. 2934.....	6	22	7	48	1.22	18	30.2	0.30	IX.
P. XXII, 42.....	6	22	8	29	1.86	27	19.6	0.30	IX.
P. XXII, 36....	5	22	8	31	2.58	50	54.3	0.29	VII, IX.
W. B. XXII, 143	8	22	8	58	3.17	99	0.9	0.30	VI.
Br. 2938.....	6.7	22	9	54	1.88	27	27.4	0.30	(VII).
W.B.XXII, 173	9	22	10	3	3.20	101	48±	0.30	VI.
W.B.XXII, 175	8.9	22	10	5	3.21	102	16.1	0.30	VI.
VI, 1453.....	....	22	10	30±	3.21	101	53.6	0.30	VI.
Br. 2942.....	7.8	22	10	37	1.11	17	18.8	0.30	(VII).
A, 1341.....	....	22	10	55	2.23	36	15.7	0.30	A, XII.
Gr. 3735.....	7	22	11	12	0.65	14	9.5	0.30	IX.
Ll. 43540.....	7½	22	12	47	3.26	107	19.5	0.30	XII.
Gr. 3734.....	7.8	22	12	54	2.37	40	47.6	0.30	VII.
Gr. 3739...	6	22	13	32	1.76	24	29.7	0.30	VI, IX.
Gr. 3743.....	8.9	22	15	6	+2.39	40	45.7	—0.30	VII.

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W.B.XXII, 288	8	22	15	34	+3.19	101	28.6	—0.30	VI.
Ll. 43636.....	8	22	16	11	3.37	116	28.1	0.30	XII, VI.
Gr. 3751...	6	22	16	42	2.53	46	53.0	0.30	VII, (VII).
P. XXII, 96.....	7	22	16	49	0.76	14	8.4	0.30	IX.
Gr. 3760..... ...	6.7	22	18	2	1.78	23	55.5	0.30	VI, IX.
Radcliffe 5671.	7.8	22	18	2	1.78	23	55±	0.30	VI, IX.
Gr. 3758.....	5.6	22	18	24	2.20	33	20.9	0.30	(VII.)
XII, 2006	....	22	19	20±	2.31	36	48.2	0.30	XII.
53 Aquarii.... (1st star).	6	22	19	50±	3.27	107	22.6	0.30	XII, IX.
53 Aquarii.... (2nd star).		22	19	47	3.27	107	22.7	0.30	XII.
A, 1347	...	22	20	11	2.31	36	55±	0.30	A, XII, VI.
VI, 1462	....	22	20	12	3.19	101	15.7	0.30	VI.
Gr. 3771.....	7.8	22	20	55	2.32	36	49.2	0.30	A, XII, VI.
A, 1349.....	....	22	21	0±	2.32	36	47.7	0.30	A, XII.
Gr. 3772...	7.8	22	21	2	2.32	36	41.5	0.30	A, XII, VI.
Gr. 3773.....	8.9	22	21	6	2.32	36	51.3	0.30	A, XII.
Gr. 3774.....	8.9	22	21	24	2.32	36	48.8	0.30	A, XII.
P. XXII, 115....	6	22	21	36	1.99	27	18.5	0.30	IX.
P. XXII, 113....	6	22	22	3	2.74	58	47.9	0.30	IX.
55 ζ^1 Aquarii .	3.4	22	22	24	3.09	90	39.6	0.30	A. XII, VII, (VII).
55 ζ Aquarii . (as one mass)		22	22	24	3.09	90	39.6	0.30	XII, VII. (VII).
55 ζ^2 Aquarii .		22	22	24	3.08	90	39.6	0.30	A. XII, VII, (VII).
Gr. 3804.....	6	22	26	55	+2.64	50	51.8	0.31	VII, (VII), IX.
Br. 2993.....	5.6	22	23	58	—3.83	4	31.3	0.31	A.XII.VI VII.(VII) IX.
Br. 2961.....	6.7	22	23	20	+3.22	163	33.3	0.30	(VII).
Br. 2997.....	7	22	23	26	—3.98	4	24.3	0.31	VI.
VI, 1467.....	....	22	23	56	+2.34	36	50±	0.30	VI.
Br. 2972.....	7	22	24	31	+2.22	32	14.1	—0.31	(VII).

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δ^1 Cephei	Var	22	24	31	+2.22	32	14.3	—0.30	A, XII.
27 δ^2 Cephei ..	Var	22	24	32	2.21	32	13.6	0.30	A, XII.
W. B. XXII,493	6	22	24	44	3.14	97	11.3	0.31	VI.
VI, 1470	....	22	24	57	2.35	36	50.7	0.31	VI.
A, 1360	....	22	26	2	+2.25	33	18.2	0.31	A, XII.
Radcliffe 5776.	7.8	22	28	2	—8.62	2	33.2	0.31	XII, VI, (VII).
Gr. 3823	6.7	22	29	24	+2.14	28	52.1	0.31	IX.
Gr. 3834	5.6	22	30	4	1.12	14	25.1	0.31	(VII), IX.
Br. 2981	7.0	22	30	19	2.66	51	1.2	0.30	(VII).
Ll. 44354.....	6.7	22	32	46	3.35	118	58.4	0.32	VII.
Gr. 3843.....	6.7	22	33	18	2.60	46	20.4	0.31	VII.
XII, 2030	...	22	33	21	2.80	61	14.2	0.31	XII.
P. XXII, 176 ...	7	22	33	32	3.16	100	0.7	0.31	A, XII, VI.
P. XXII, 186 ...	6.7	22	34	41	2.95	76	6.5	0.31	IX.
A, 1370.....	....	22	34	50±	1.98	24	8.9	0.31	A, XII.
Ruemker 10511.	....	22	35	24	2.81	61	21±	0.31	VI.
VI, 1482.....	....	22	35	30±	2.81	61	20.6	0.31	VI.
P. XXII, 197 ...	6½	22	35	43	2.60	45	38.8	0.31	A, XII.
P. XXII, 195...	6	22	35	47	2.95	76	8.2	0.31	IX.
A, 1372	....	22	36	37	2.01	24	8.8	0.31	A, XII.
Ll. 44463	8	22	37	29	2.99	79	42.6	0.31	VII.
Ll. 44487	8	22	38	4	2.81	61	22.7	0.31	XII, VI.
Gr. 3887.....	6	22	39	6	0.24	9	15.7	0.31	IX.
A, 1373	....	22	40	0	2.05	24	9.9	0.31	A, XII.
Gr. 3882.....	5½	22	40	37	2.63	46	6.9	0.31	XII.
Br. 3011..... (1st star).	8	22	41	23	3.10	94	52.7	0.31	(VII).
Br. 3011 ..... 2d star.	7.8	22	41	23	+3.10	94	53.6	—0.31	(VII.)

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A, 1374....	....	22 41 43	3.04	86 29.7	0.31	A, XII.
Br. 3014.....	6.7	22 42 26	2.37	32 10.5	0.32	IX.
VI, 1486.....	....	22 42 38	1.93	21 12.9	0.31	VI.
VI, 1487.....	....	22 42 40±	1.93	22 13.2	0.32	VI.
A, {1377 / 1378}	8.9	22 44 9	2.09	24 6.3	0.32	A, XII.
Gr. 3900	5	22 44 37	2.45	34 45.5	0.32	VII.
Gr. 3904.....	6.7	22 44 45	2.01	22 5.5	0.32	IX.
Oe. A. (N.), 24748	7	22 44 46	2.01	22 5.5	0.32	IX.
Gr. 3901.....	7	22 44 48	2.55	39 58.9	0.32	A, XII.
Oe. A. 24755....	8.9	22 45 10	2.11	24 6.3	0.32	A, XII, VI.
Br. 3028.....	6	22 46 30	2.31	28 58.0	0.32	VII, IX.
P. XXII, 241 ...	6	22 46 53	2.95	73 49.2	0.32	IX.
Gr. 3913.....	7.8	22 47 15	2.57	39 57.4	0.32	A, XII.
VI, 1493.....	...	22 47 28	+3.14	98 42.4	0.32	VI.
Br. 3038.....	5	22 47 55	−0.05	7 30.5	0.32	A, XII, IX.
Ll. {44815 / 44816} ..	7	22 48 14	+2.85	62 38.7	0.32	XII.
Gr. 3919.....	6	22 48 23	2.73	50 17.3	0.32	IX.
P. XXII, 250....	6	22 48 42	3.12	95 39.1	0.32	IX.
Ll. {44846 / 44847} ..	7½	22 48 57	2.86	62 39.3	0.32	XII.
W. B. XXII,1302	8	22 49 13	3.13	98 29.2	0.32	VI.
A, 1385.....	....	22 49 22	2.15	24 3.2	0.32	A, XII.
Gr. 3921.....	8	22 49 35	+2.61	41 13.5	0.32	VII.
XII, 2065	....	22 50 25	−0.82	5 53.2	0.32	XII.
VI, 1498.....	....	22 50 43	+3.13	98 13.8	0.32	VI.
Br 3033.....	7.8	22 50 49	3.11	95 28.7	0.32	(VII).
Gr. 3930.....	6.7	22 50 58	2.61	40 56.0	0.32	VII.
Gr. 3933.....	6	22 51 33	+2.63	41 59.0	−0.32	XII, IX.

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W. B. XXII,1075	9	22	52	40	+3.01	80	51.8	−0.32	IX.
P. XXII, 262 ...	6	22	52	46	+3.32	120	7.9	0.32	A, XII.
Gr. 3938.....	8.9	22	53	6	+2.62	40	49.0	0.32	VII.
XII, 2069.....	....	22	53	49	−0.81	5	37.2	0.32	XII.
Gr. 3946.....	6.7	22	53	54	+1.87	17	32.0	0.32	IX.
XII, 2070.....	....	22	53	56	−1.04	5	17.9	0.32	XII.
Gr. 3947.....	6.7	22	54	55	+2.70	45	17.7	0.32	XII.
Br. 3058.....	5.6	22	55	14	−0.21	6	19.3	0.32	(VII), IX.
Br. 3041.....	7	22	55	22	+3.05	87	8.3	0.32	IX.
VII, 1924.....	....	22	55	39	3.16	102	32.8	0.32	VII, (VII).
Gr. 3952.....	7.8	22	55	54	2.70	45	9.7	0.32	XII.
P. XXII, 282....	5.6	22	56	34	3.34	125	25.5	0.32	(VII).
VI, 1502.....	....	22	58	47	3.16	103	28.5	0.32	VI.
Br. 3054.....	6	22	58	48	2.26	23	27.9	0.31	VII, (VII), IX.
Br. 3067.....	7	22	59	6	1.09	9	53.5	0.32	(VII).
P. XXII, 297....	7.8	22	59	20	2.98	75	43.0	0.32	XII.
VI, 1503.....	....	22	59	55	3.12	97	30.1	0.32	VI.
R Pegasi.....	Var	23	0	22	3.01	80	7.8	0.32	(VII), IX.
VII, 1934.....	....	23	1	20	3.15	102	1.0	0.32	VII.
Br. 3060.... ...	6.7	23	1	35	2.72	44	36.5	0.32	(VII).
Gr. 3993.....	6.7	23	2	42	2.42	27	2.6	0.32	XII, VI.
Gr. 3994.....	6	23	2	53	2.41	26	27.2	0.32	IX.
Br. 3066.....	7.8	23	2	59	3.06	88	32.1	0.32	(VII).
VII, 1937... ...	....	23	3	0	3.14	101	51.1	0.32	VII, (VII),
VI, 1505.....	....	23	3	3	3.15	103	8.0	0.32	VI.
Gr. 3996.....	8	23	3	38	2.70	41	1.6	0.32	VII.
Gr. 4008.....	8	23	4	43	1.26	10	2.5	0.32	XII.
Gr. 4009	7.8	23	4	57	+1.29	10	6.8	−0.31	XII.

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Gr. 4005.....	6	23	5	0	+2.34	23	26.1	−0.32	(VII), IX.
VI, 1506.....	....	23	5	20	3.15	103	2.6	0.32	VI.
XII, 2084.....	....	23	6	43	3.07	89	0.6	0.32	XII, VI.
Br. 3077.....	6	23	7	16	2.86	33	31.3	0.33	IX.
VI. 1509.....	....	23	8	17	3.14	102	45.1	0.33	VI.
Br. 3079.....	7	23	8	52	2.92	62	36.6	0.33	(VII).
B. F. 3183.....	5.6	23	9	8	3.09	94	10.6	0.33	VII, IX.
Br. 3085	6	23	10	11	2.09	16	27.0	0.33	IX.
W. B. XXIII,173	8.9	23	10	34	3.13	101	3.0	0.33	VII, (VII).
Br. 3086.....	6	23	10	49	2.28	19	47.6	0.33	IX.
Br. 3084.....	6	23	11	1	2.70	37	27.6	0.32	IX.
W. B. XXIII,222	8	23	12	17	3.10	96	18.6	0.33	VII, (VII.)
W. B. XXIII,229	8.9	23	12	29	3.05	85	16.3	0.33	VI.
Gr. 4040.....	6	23	13	23	2.19	16	59.6	0.33	IX.
XII, 2094.....	....	23	13	30	2.95	66	51.4	0.33	XII, VI.
P. XXIII, 48	8	23	13	30	2.95	66	51.4	0.33	VI.
VI, 1516.....	....	23	13	33	3.13	102	7.5	0.33	VI, VII.
Br. 3094.....	6	23	13	50	2.79	42	18.2	0.33	(VII), IX.
Br. 3100	7.8	23	15	17	2.87	52	6.1	0.33	IX.
Gr. 4047.....	7.8	23	15	26	1.82	11	41±	0.33	XII.
Br. 3107.....	6.7	23	16	32	3.01	70	7.6	0.33	(VII.)
Br. 3109.....	7	23	17	39	2.95	58	9.4	0.32	(VII).
VI, 1523.....	....	23	19	29	3.12	101	20.6	0.33	VI.
VI, 1525..... ..	....	23	19	31	3.15	108	48.4	0.33	VI.
Br. 3121.....	6	23	21	1	2.45	20	0.1	0.33	IX.
Br. 3125.....	6	23	22	0	2.48	20	19.7	0.33	A, XII, VII,(VII) IX.
Ll. 45976.....	9	23	22	37	2.82	42	2.6	0.33	XII, VI.
P. XXIII, 96....	6.5	23	23	4	3.10	95	12.9	0.32	VII, IX.
W. B. XXIII,444	9	23	23	10	+3.05	84	35.2	−0.33	VI.

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Ll. 46011.....	8	23	23	47	+2.99	69	8.3	—0.33	XII.
P. XXIII, 100...	7.8	23	24	7	2.74	32	8.4	0.33	A, XII, VII, (VII).
P. XXIII, 101 ..	5	23	24	16	2.75	32	8.4	0.33	A, XII, VII, (VII).
VI, 1529.....	....	23	25	0±	2.84	42	2.7	0.33	VI.
P. XXIII, 103..	7	23	25	4	3.09	94	46.3	0.32	VII.
VI, 1530.....	....	23	25	7	2.84	42	3.2	0.33	XII, VI.
Br. 3127.....	7.8	23	25	16	3.15	111	56.4	0.33	(VII).
W. B. XXIII, 487	8.9	23	25	21	3.04	81	22.2	0.33	VI.
VI, 1532.....	....	23	27	4	3.04	80	39.4	0.33	VI.
Br. 3135.....	6.7	23	27	12	+2.51	18	41.3	0.33	IX.
Br. 3147.....	6	23	27	50	—0.02	3	22.9	0.33	A, XII, VII (VII), IX.
Ll. 46194.....	7.8	23	28	49	+3.09	94	32.7	0.33	VII.
P. XXIII, 126..	6.7	23	29	5	3.09	98	9.3	0.33	IX.
Br. 3140.....	6	23	29	34	2.56	19	2.9	0.33	IX.
W. B. (2) XXIII, 612.	8	23	29	42	3.02	72	15.3	0.33	IX.
XII, 2113.....	8	23	29	53	3.05	83	50±	0.33	XII.
W. B. XXIII, 602	9	23	30	26	3.06	84	46.6	0.33	VI.
Ll. 46261.....	8	23	30	45	2.91	47	23.0	0.33	VII, (VII).
P. XXIII, 133...	6	23	31	11	3.12	103	45.3	0.33	VI, (VII.)
Gr. 4105.....	6.7	23	31	26	2.91	46	15.7	0.33	IX.
W. B. XXIII, 644	9	23	32	25	3.04	78	49.2	0.33	VI.
W. XXIII, 658..	9	23	33	10±	3.11	102	38.7	0.33	A, XII.
P. XXIII, 153 ..	6	23	34	41	3.11	102	22.5	0.33	VI, (VII), IX.
(VII), 2711.....	....	23	35	8	3.08	95	55.4	0.33	(VII).
Gr. 4125.... ...	9	23	35	21	2.90	41	10.8	0.33	VII.
Oe. A. 25927....	9	23	35	25	2.47	13	19.5	0.33	VII, (VII).
Gr. 4128.....	6	23	36	6	2.93	45	42.1	0.33	A, XII.
Br. 3155.....	7.8	23	36	12	3.03	72	1.6	0.33	(VII).
Oe. A. 25947....	6.7	23	36	34	+2.82	29	0.9	—0.33	XII, VI.

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BR. 3158.....	7	23	37	1	+2.90	37	32.4	—0.33	IX.
VII, 1986.....	Var	23	37	21	3.11	105	58.6	0.33	VII, (VII).
107 i^3 Aquarii.. (1st star)	5.6	23	39	31	3.12	109	22.5	0.33	(VII.)
107 i^3 Aquarii .. (2nd star).....	....	23	39	31	3.12	109	22.6	0.33	(VII).
P. XXIII, 185...	6	23	40	50	3.08	102	56.1	0.33	IX.
BR. 3166.....	6	23	41	57	2.82	22	53.3	0.33	VII, (VII), IX.
P. XXIII, 190...	6.7	23	42	7	3.07	97	4.5	0.33	IX.
P. XXIII, 193..	6.7	23	42	25	3.06	88	28.7	0.33	IX.
W.B. XXIII, 853	9	23	42	40	3.07	88	15.5	0.33	(VII).
BR. 3168	7	23	42	47	2.90	30	43.0	0.33	IX.
BR. 3170	6	23	43	4	2.91	31	43.9	0.33	(VII), IX.
VI, 1548.....	....	23	43	20±	3.10	103	41.1	0.33	VI.
W.B. XXIII, 868	7	23	43	41	3.09	101	48.0	0.33	VI.
P. XXIII, 202...	9	23	43	47	2.90	28	28.9	0.33	A, XII.
P. XXIII, 200...	6.7	23	43	48	3.09	100	40.3	0.33	VI. (VII), IX.
W.B. XXIII, 876	7	23	44	4	3.10	103	49±	0.33	VI.
BR. 3181.....	7	23	45	56	2.73	13	5.6	0.33	A, XII.
BR. 3175.....	6	23	46	8	3.04	69	1.4	0.33	(VII).
VI, 1551.....	....	23	46	16	3.05	75	33.6	0.33	VI.
P. XXIII, 218...	6.7	23	46	20	2.78	15	9.1	0.33	IX.
VII, 1997.....	....	23	46	27	3.08	97	39.7	0.33	VII.
ARG. Zone +58° NO. 2667.....	8	23	46	50	2.94	31	16.4	0.33	IX.
VII, 1998.....	....	23	47	13	3.08	97	29.3	0.33	VII.
P. XXIII, 227...	6.7	23	48	23	3.06	90	35.1	0.33	IX.
GR. 4163.....	6.7	23	48	46	2.87	16	17.1	0.34	VII. (VII), IX.
P. XXIII, 229...	6	23	49	2	3.04	64	44.4	0.33	IX.
ARG. Zone +58° No. 2672.....	7	23	49	17	2.97	31	16.8	0.33	IX.
BR. 3184.....	6.7	23	49	18	+2.98	33	17.1	—0.33	(VII).

Name.	Mag.	R. A. 1875.0.			Annual variation in R. A.	N. P. D. 1875.0.		Annual variation in N. P. D.	Greenwich Catalogues.
		h.	m.	s.	s.	°	′	′	
VI, 1b52.... ...	....	23	50	29	+3.07	85	12.0	—0.33	VI, VII.
Br. 3187.....	7	23	50	38	2.67	7	30.4	0.33	(VII).
P.XXIII, 236...	....	23	50	38	2.98	34	51.4	0.33	A, XII.
Br. 3185...	6	23	50	52	3.01	34	59.5	0.33	A, XII.
W.B.XXIII,1032	9	23	51	24	3.07	85	17.6	0.33	VI, VII, (VII).
P.XXIII, 242...	6	23	51	48	3.02	40	15.7	0.33	XII.
(VII), 2748	Var	23	52	4	3.01	39	18.5	0.33	(VII).
P. XXIII, 247...	7	23	52	54	3.02	40	10.1	0.33	XII.
Gr. 4191.....	7.8	23	53	1	3.02	40	11.4	0.33	XII.
Br. 3194.....	6.7	23	53	40	2.56	3	59.5	0.33	VI, VII.
Br. 3192.....	7	23	54	0	3.06	63	46.6	0.33	IX.
Br. 3193.....	7	23	54	22	3.02	28	31.2	0.33	(VII).
Ll. 47098.....	8	23	54	59	3.07	83	54.3	0.33	VII.
Br. 3195.... ...	6.7	23	55	15	3.02	29	28.4	0.33	XII, VI, VII, IX.
Gr. 4199.....	6	23	55	21	3.04	48	19.8	0.33	A, XII.
Br. 3199.....	7.8	23	55	38	3.07	93	27.8	0.33	(VII).
Gr. 4202.....	8	23	55	49	3.04	40	55.5	0.33	VII.
Ll. 47132.....	9	23	56	0	3.08	96	45.2	0.33	VII.
Br. 3202.....	6.7	23	56	13	3.02	24	35.8	0.33	IX.
Oe. A. (N). 26322	8	23	56	15	3.02	24	35.7	0.33	IX.
Gr. 4206.....	8	23	56	18	3.04	47	46.6	0.33	VI.
Br. 3203.....	....	23	56	22	2.92	7	43.6	0.33	A, XII.
Gr. 4207.....	7.6	23	56	44	3.05	47	57.0	0.33	XII. VI, VII (VII).
VI, 1564.....	....	23	56	50±	3.04	32	13.4	0.33	VI.
XII, 2148.....	....	23	56	57	3.04	32	10±	0.33	XII.
Gr. 4215.....	8	23	57	44	3.05	40	42.5	0.33	VII.
Gr. 4216.....	7.8	23	57	45	3.05	40	49.6	0.33	VII.
Br. 3207.....	6.7	23	58	29	+3.06	32	9.8	—0.33	XII, VI, IX.

Name.	Mag.	R. A. 1875.0.			Annual variation in R. A.	N. P. D. 1875.0.		Annual variation in N. P. D.	Greenwich Catalogues.
		h.	m.	s.	s.	°	′	′	
P. XXIII, 270...	6.7	23	58	39	+3.08	91	11.8	—0.33	IX.
Gr. 4222.....	6	23	58	39	3.06	29	22.9	0.33	XII, VII, IX.
VI, 1568.....	....	23	58	46	3.07	89	39.9	0.33	VI.
VI, 1569.... ...	....	23	58	47	3.07	90	6.5	0.33	VI.
Gr. 4226.....	8	23	58	57	3.06	40	55.4	0.33	VII.
W.B. XXIII, 1194	8	23	59	4	3.07	98	21.7	0.33	VI.
Gr. 4229.....	7.8	23	59	31	3.06	41	4.4	0.33	VII.
Br. 3210.....	6.7	23	59	44	3.10	32	15.6	0.33	XII, IX.
W.B. XXIII, 1208	8	23	59	53	+3.07	101	28.6	—0.33	VI.

VIII. METEOROLOGICAL OBSERVATIONS FOR THE YEAR 1886.

METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF JANUARY, 1886.

Day.	Observations Taken at 7 A. M., 2 P. M., and 9 P. M. Means Refer to Day Ending 12 P. M.			For 24 Hours Ending 9 P. M.			For 24 Hours Ending 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum velocity of the wind.	Total movement of the wind.
	Inches.	°	*Pr. ct.*	*Inches*	°	°	*Miles.*	*Miles.*
1	28.996	32.4	95	0.10*	35	28	16	227
2	28.887	33.2	100	.....	35	31	10	111
3	28.611	34.2	100	0.55	35	32	18	261
4	28.538	27.7	91	0.56	35	25	28	322
5	28.988	17.6	84	.....	26	15	38	562
6	29.131	11.6	83	.....	16	7	18	314
7	29.112	13.4	91	—**	15	10	22	327
8	28.835	10.0	94	0.40*	14	+ 6	32	514
9	28.914	— 4.6	82	.....	+ 6	—11	36	557
10	29.119	—14.0	73	.....	—11	—20	23	452
11	29.339	— 9.7	78	.....	— 5	—18	20	313
12	29.212	+ 2.0	83	0.08*	+ 6	—14	16	219
13	29.216	11.8	88	.....	16	+ 5	22	262
14	29.266	22.7	90	0.03*	26	11	25	363
15	28.968	27.4	95	0.15*	28	24	20	303
16	28.783	15.2	92	0.15*	28	+ 8	20	181
17	29.127	7.3	83	0.08*	11	— 1	22	288
18	28.894	12.8	92	0.29*	15	+ 9	5	54
19	29.084	4.4	84	0.12*	12	+ 1	20	252
20	29.002	10.2	90	0.30*	13	+ 2	14	149
21	29.028	7.5	74	.....	12	— 3	14	236
22	29.139	—10.7	82	0.19*	+10	—21	25	390
23	29.413	—11.7	88	0.01*	— 8	—24	26	212
24	29.031	9.2	78	0.02*	+15	— 9	28	133
25	28.889	21.2	82	.....	25	14	25	393
26	29.095	21.1	90	0.15*	26	18	12	162
27	29.041	18.9	86	0.10*	22	15	25	309
28	28.900	19.6	89	.....	22	16	25	273
29	28.829	10.0	83	.....	20	7	18	215
30	28.660	7.6	89	0.05*	15	4	20	184
31	28.912	9.8	82	.....	13	— 1	20	257
Sums.	.....	.....	.....	3.33	.....	.....	.....	8,795
Means	28.999	11.9	86.8	.....	.....	.....	.....	.....

Highest barometer, 29.441 inches; lowest, 28.456 inches. Highest temperature, 35°; lowest, —24°. Range of barometer, 0.985 inches. Range of thermometer, 59°. Maximum velocity of wind, 38 miles from N. W. Prevailing winds, N. W. Number of clear days, 6; fair days, 11; cloudy days, 14. Number of times the wind blew from the N., 17; N. E., 14; E., 4; S. E., 5; S., 17; S. W., 0; W., 12; N. W., 22. (Three observations daily.)

* Melted snow. ** Precipitation too small to measure.

METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF FEBRUARY, 1886.

Day.	Observations Taken at 7 A. M., 2 P. M. and 9 P. M. Means Refer to Day ending 12 P. M.			For 24 Hours Ending 9 P. M.			For 24 Hours Ending 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum velocity of the wind.	Total movement of the wind.
	Inches.	°	*Pr. ct.*	*Inches.*	°	°	*Miles.*	*Miles.*
1	29.068	+ 1.4	83	.....	+ 11	— 3	20	202
2	29.391	—12.5	72	.....	— 3	—18	20	286
3	29.405	— 9.7	69	.....	— 4	—21	18	198
4	29.512	— 6.8	72	.....	— 1	—14	16	215
5	29.202	+ 7.7	75	.....	+12	—11	26	319
6	28.986	26.4	85	.....	32	+ 7	36	218
7	28.904	31.3	83	.....	38	18	22	207
8	28.663	32.6	85	.....	40	26	28	314
9	28.659	36.8	76	.....	43	29	13	231
10	28.833	36.8	88	0.20	40	34	14	225
11	28.917	34.2	100	0.31	38	33	10	134
12	28.739	34.6	100	0.37	35	33	16	220
13	28.497	34.2	92	.....	37	33	15	155
14	28.873	19.3	84	0.20*	33	16	32	330
15	29.106	8.8	82	.....	23	+ 1	25	230
16	29.347	7.1	71	.....	12	— 6	28	333
17	28.906	26.9	76	.....	32	+ 4	32	439
18	28.618	34.3	83	.....	39	25	32	375
19	28.986	13.7	81	0.05*	31	10	36	494
20	29.020	17.2	82	0.02*	22	+ 3	26	233
21	28.839	19.8	84	0.03*	26	16	40	603
22	28.838	33.8	68	.....	40	12	38	393
23	29.281	28.4	71	.....	35	21	24	273
24	28.698	37.9	82	0.60	43	28	28	440
25	28.699	10.6	72	.....	37	6	36	580
26	29.223	12.1	72	.....	17	0	28	368
27	29.156	19.6	87	0.05*	22	16	.....	283
28	29.235	16.4	91	0.52*	19	14	20	336
Sums.	.....	.....	.....	2.35	.....	.....	.....	8,684
Means	28.986	19.7	80.9	.....	.....	.....	.....	.....

Highest barometer, 29.518 inches; lowest, 28.421 inches. Highest temperature, 43°; lowest, —21°. Range of barometer, 1.097 inches. Range of thermometer, 64°. Maximum velocity of wind, 40 miles from South. Prevailing winds, N. W. Number of clear days, 9; fair days, 11; cloudy days, 8.

Number of times the wind blew from the N., 9; N. E., 3; E., 5; S. E., 5; S., 19; S. W., 10; W., 10; N. W., 23. (Three observations daily.)

*Melted snow.

METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF MARCH, 1886.

Day.	Observations Taken at 7 A. M., 2 P. M., and 9 P. M. Means Refer to Day Ending 12 P. M.			For 24 Hours Ending 9 P. M.			For 24 Hours Ending 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum velocity of the wind.	Total movement of the wind.
	Inches.	°	*Pr. ct.*	*Inches.*	°	°	*Miles.*	*Miles.*
1	29.438	13.2	80	.....	18	6	25	405
2	29.462	13.7	70	.....	21	4	12	150
3	29.367	20.3	55	.....	28	8	10	144
4	29.275	22.6	74	.....	31	12	.....	90
5	29.135	26.2	80	.....	35	19	11	140
6	29.149	29.4	65	.....	39	18	12	141
7	28.817	31.3	75	.....	36	21	28	235
8	28.784	24.1	82	—*	34	20	28	397
9	29.062	20.1	87	—*	25	15	18	292
10	29.140	23.2	71	.....	32	11	18	199
11	28.710	29.2	89	0.13	33	18	30	447
12	28.510	32.2	88	.....	39	26	22	198
13	28.553	24.4	71	.....	32	20	18	254
14	28.696	28.7	93	0.10	32	22	18	200
15	28.874	28.3	76	0.04	33	24	15	275
16	29.070	34.5	88	.....	42	23	20	223
17	28.970	40.6	75	.....	49	34	18	287
18	28.866	37.0	90	0.03	41	34	18	243
19	28.549	37.4	95	0.05	45	34	18	211
20	28.319	32.1	96	1.00	36	31	30	379
21	28.499	31.4	81	1.50	37	28	36	615
22	28.972	29.3	65	.....	37	21	25	416
23	29.168	25.7	77	.....	35	16	16	195
24	28.740	42.5	67	.....	49	25	30	328
25	29.021	37.9	65	.....	44	36	20	334
26	29.106	31.2	68	.....	38	29	18	301
27	29.266	27.8	77	.....	31	26	20	247
28	29.162	25.0	91	0.36	29	23	23	375
29	28.977	32.1	90	0.04	36	23	28	214
30	28.863	29.5	86	0.44	33	26	28	344
31	28.401	31.6	100	0.98	32	29	24	403
Sums.	.....	.....	.....	4.67	.....	.....	.....	8,682
Means	28.931	28.9	79.9	.....	.....	.....	.....	.....

Highest barometer, 29.509 inches; lowest, 28.182 inches. Highest temperature, 49°; lowest, 4°. Range of barometer, 1.327 inches. Range of thermometer, 45°. Maximum velocity of wind, 36 miles from N. W. Prevailing winds, N. W. Number of clear days, 8; fair days, 15; cloudy days, 8.

Number of times the wind blew from the N., 19; N. E., 15; E., 2; S. E., 2; S., 12; S. W., 8; W., 12; N. W., 23. (Three observations daily).

*Inappreciable.

METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF APRIL, 1886.

Day.	Observations Taken at 7 A. M., 2 P. M., and 9 P. M. Means Refer to Day Ending 12 P. M.			For 24 Hours Ending 9 P. M.			For 24 Hours Ending 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum velocity of the wind.	Total movement of the wind.
	Inches.	°	*Pr. ct.*	*Inches.*	°	°	*Miles.*	*Miles.*
1	28.732	25.0	88	....*...	34	21	24	331
2	29.139	19.3	69	.....	28	10	20	201
3	29.236	18.0	83	.....	27	8	20	139
4	29.263	22.3	71	.....	33	10	18	179
5	29.197	29.4	60	.....	42	14	7	94
6	29.062	34.9	62	.....	41	24	12	273
7	29.089	34.4	59	.....	45	25	24	269
8	29.138	37.7	63	.....	48	22	10	108
9	29.032	43.8	74	.....	53	29	12	219
10	29.135	37.3	91	0.12	42	36	12	168
11	29.066	39.6	90	0.08	46	35	15	214
12	29.078	43.4	91	.....	50	36	12	151
13	29.067	49.5	89	0.18	59	36	12	143
14	28.913	58.6	94	0.08	68	48	36	295
15	28.851	61.0	84	.....	71	56	28	428
16	28.845	57.9	94	0.48	64	55	30	414
17	29.098	59.0	78	.....	69	49	32	450
18	29.271	61.9	74	0.02	74	52	20	199
19	29.383	61.6	71	.....	72	51	28	127
20	29.247	66 2	51	.....	77	53	10	92
21	29.122	64.6	74	.....	75	56	15	158
22	29.033	67.4	39	.....	77	55	22	227
23	28.781	63.0	69	0.02	75	59	28	273
24	28.928	48.6	72	0.01	59	46	25	312
25	28.828	46.4	85	0.37	63	42	12	195
26	28.496	54.6	60	0.55	67	47	40	354
27	28.673	48.8	65	.....	59	43	38	700
28	28.767	56.8	65	.....	67	46	28	328
29	28.713	49.4	83	0.57	57	45	20	314
30	28.916	50.7	63	.....	59	43	24	279
Sums.	.....	.....	.....	2.48	.....	.....	.....	7,629
Means	29.004	47.0	73.7	.....	.....	.....	.....	.....

Highest barometer, 29.414 inches; lowest, 28.434 inches. Highest temperature, 77°; lowest, 8°. Range of barometer, 0.980 inches. Range of thermometer, 69°. Maximum velocity of wind, 40 miles from South. Prevailing winds, South. Number of clear days, 9; fair days, 11; cloudy days, 10.

Number of times the wind blew from the N., 13; N. E., 10; E., 5; S. E., 14; S., 28; S. W., 4; W., 5; N, W., 10. (Three observations daily.)

*Inappreciable.

METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF MAY, 1886.

DAY.	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	For 24 Hours Ending 9 P. M. Rain or melted snow.	Maximum temperature.	Minimum temperature.	For 24 Hours Ending 2 P. M. Maximum velocity of the wind.	Total movement of the wind.
	Inches.	°	Pr. ct.	Inches.	°	°	Miles.	Miles.
1	29.020	50.5	73	0.01	59	45	26	307
2	29.127	57.4	77	.....	66	46	8	94
3	28.978	57.6	78	.....	64	52	16	146
4	28.817	56.6	64	.....	62	53	22	343
5	28.907	57.4	58	.....	67	44	15	180
6	28.972	53.0	77	.....	66	46	30	174
7	28.993	51.6	47	.....	58	37	28	204
8	28.887	56.9	71	0.16	67	48	20	209
9	28.722	51.8	89	1.25	58	50	22	258
10	28.736	55.5	84	0.06	68	48	25	210
11	28.858	63.9	65	.....	78	54	16	232
12	28.774	61.9	64	.....	71	53	13	144
13	28.708	61.8	78	0.04	76	51	16	163
14	28.664	50.1	80	0.07	61	48	25	242
15	28.903	45.8	60	0.12	54	43	24	229
16	29.036	49.1	58	.....	63	37	20	207
17	29.166	54.5	64	.....	62	42	22	282
18	29.250	58.3	80	0.30	71	58	25	318
19	29.057	67.7	62	.....	80	49	10	120
20	28.883	60.3	61	.....	74	54	18	200
21	28.929	70.6	58	.....	83	50	23	331
22	28.984	72.2	63	.....	81	65	20	249
23	28.998	67.1	62	.....	79	62	16	175
24	29.091	58.9	54	.....	73	54	16	161
25	29.074	56.3	54	.....	68	46	28	152
26	28.917	66.4	69	.....	76	56	20	250
27	28.846	63.0	53	.....	72	56	25	334
28	28.891	63.5	57	.....	77	55	18	204
29	28.944	70.2	48	0.01	82	62	24	357
30	29.004	63.5	62	.....	73	55	14	133
31		65.9	64	.....	79	52	12	120
Sums.	.....	.....	.....	2.02	.....	.....	... ...	6737
Means	28.935	59.3	65.7	.....	.....	.....	.....	.....

Highest barometer, 29.250 inches; lowest, 28.664 inches. Highest temperature, 83°; lowest, 37°. Range of barometer, 0.586 inches. Range of thermometer, 46°. Maximum velocity of wind, 32 miles from South. Prevailing winds, South.

Number of clear days, 12; fair days, 17; cloudy days, 2.

Number of times the wind blew from the N., 18; N. E., 7; E., 2; S. E., 5; S., 21; S. W., 15; W., 14; N. W., 16. (Three observations daily.)

METEROLOGICAL OBSERVATIONS FOR THE MONTH OF JUNE, 1896.

Day.	Observations Taken at 7 A. M., 2 P. M., and 9 P. M. Means Refer to Day Ending 12 P. M.			For 24 Hours Ending 9 P. M.			For 24 Hours Ending 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum velocity of the wind.	Total movement of the wind.
	Inches.	°	*Pr. ct.*	*Inches,*	°	°	*Miles.*	*Miles.*
1	28.829	66.4	76	0.28	76	58	20	243
2	29.014	58 2	56	.....	66	54	24	277
3	29.176	60.4	73	.....	72	44	28	262
4	28.987	64.4	44	.....	74	54	25	248
5	28.957	63.9	71	0.11	72	51	28	237
6	28.959	60.7	70	0.10	70	51	12	155
7	29.091	57.2	68	.....	72	52	16	207
8	29.082	63.9	64	.....	80	46	16	183
9	28.866	70.4	57	.....	83	58	16	200
10	28.930	65.0	64	.....	76	58	20	201
11	28.904	72.7	48	.....	84	55	24	211
12	28.881	76.4	57	.....	88	64	22	341
13	28.812	78.6	70	0.09	91	70	26	339
14	28.828	79.6	71	.....	94	70	9	121
15	28.732	74,6	83	0.21	83	70	12	212
16	28.735	72.5	73	.....	81	66	10	115
17	28.872	62.0	63	.....	78	60	23	267
18	29.053	61.4	59	.....	76	50	20	217
19	29.050	64.7	55	.....	78	53	18	292
20	28.966	66.3	69	0.08	80	54	20	259
21	28.959	68.4	68	.....	87	56	15	133
22	28.865	69.3	62	.....	88	60	36	208
23	28.851	68.8	78	.....	79	61	12	223
24	28.854	63.9	76	*	72	61	16	195
25	28.936	66.8	69	.....	75	59	12	144
26	29.022	68.2	67	.....	82	60	15	126
27	29.043	67.8	61	0.21	76	63	10	151
28	29.125	72.0	68	.....	80	57	9	201
29	29.132	71.6	58	.....	82	60	7	116
30	29.168	72.6	60	.....	88	64	10	134
Sums.	.....	.....	.....	1.08	.....	.....	.....	6,218
Means	28.956	67.6	65.3	.....	.....	.....	.....	.....

Highest barometer, 29.233 inches; lowest, 28.706 inches. Highest temperature, 94°; lowest, 44°. Range of barometer, 0.527 inches. Range of thermometer, 50°. Maximum velocity of wind, 36 miles from N. Prevailing winds, S.

Number of clear days, 14; fair days, 15; cloudy days, 1.

Number of times the wind blew from the N., 11; N. E., 9; E., 5; S. E., 9; S., 22; S. W., 12; W , 6; N. W., 16. (Three observations daily.)

*Rainfall too small to measure.

METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF JULY, 1886.

Day.	Observations Taken at 7 A. M., 2 P. M., and 9 P. M. Means refer to day ending 12 P. M.			For 24 Hours Ending 9 P. M.			For 24 Hours Ending 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum velocity of the wind.	Total movement of the wind.
	Inches.	°	*Pr. ct.*	*Inches.*	°	°	*Miles.*	*Miles.*
1	29.110	72.0	60	.....	86	61	10	123
2	29.093	71.9	50	.....	88	57	12	163
3	29.087	77.6	61	.....	88	63	16	100
4	29.069	80.2	58	.....	92	66	18	151
5	29.036	80.2	60	.....	93	69	20	311
6	29.041	87.2	33	.....	100	73	20	342
7	29.162	71.5	63	.....	86	70	17	234
8	29.126	69.1	65	.....	87	60	12	95
9	28.977	68.1	77	0.41	78	61	19	123
10	29.023	77.9	60	.....	88	63	12	100
11	28.983	75.6	73	0.02	85	68	29	154
12	28.873	74.1	77	0.06	83	70	12	103
13	28.812	71.9	66	.....	92	66	18	247
14	29.012	69.5	55	.....	78	59	35	564
15	28.944	70.5	58	.....	80	60	18	152
16	28.931	73.3	58	.....	86	62	11	154
17	29.063	64.4	63	.....	74	58	13	214
18	29.014	66.1	58	.....	80	54	12	141
19	28.855	71.0	67	0.06	83	59	16	210
20	28.879	69.0	63	.....	81	62	15	138
21	28.859	54.5	64	.....	84	61	16	190
22	29.037	53.9	60	.....	82	53	17	158
23	29.083	74.9	48	.....	88	60	16	211
24	28.929	77.2	53	0.06	89	66	26	331
25	28.826	84.5	39	.....	90	71	22	331
26	28.809	74.2	73	0.07	90	67	18	150
27	28.809	79.2	53	0.11	91	66	20	160
28	28.765	82.9	47	.....	94	68	22	226
29	28.890	73.3	62	.....	81	67	22	263
30	28.950	70.3	64	.....	80	65	10	110
31	28.888	71.3	79	.....	82	62	12	105
Sums.	.....	.....	.....	0.79	.....	.....	.....	6,054
Means	28.966	73.8	60	.....	.....	.....	.....	.....

Highest barometer, 29.264 inches; lowest, 28.727 inches. Highest temperature, 100°; lowest, 54°. Range of barometer, .537 inches. Range of thermometer, 46°. Maximum velocity of wind, 35 miles from N. E. Prevailing winds, N., S. and S. E. Number of clear days, 17; fair days, 12; cloudy days, 2. Number of times the wind blew from the N., 23; N. E., 8; E., 6; S. E., 12; S., 19; S. W., 10; W., 7; N. W., 8. (Three observations daily.)

METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF AUGUST, 1886.

Day.	Observations Taken at 7 A. M., 2 P. M. and 9 P. M. Means Refer to Day Ending 12 P. M.			For 24 Hours Ending 9 P. M.			For 24 Hours Ending 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum velocity of the wind.	Total movement of the wind.
	Inches.	°	*Pr. ct.*	*Inches.*	°	°	*Miles.*	*Miles.*
1	28.907	72.6	60	0.04	81	66	20	168
2	29.040	66.5	57	.....	86	61	18	299
3	29.056	68.2	54	.....	81	60	16	154
4	29.046	68.6	72	—*	75	63	16	153
5	28.995	71.7	81	0.27	79	62	12	114
6	28.953	68.1	77	0.07	80	61	10	151
7	29.000	66.9	72	.....	81	56	12	104
8	29.044	75.5	48	.....	88	59	16	190
9	29.056	76.4	60	.....	90	66	21	334
10	28.956	80.1	55	—*	92	70	22	301
11	28.951	74.0	60	—*	82	69	12	144
12	28.819	79.1	64	.....	92	61	11	144
13	28.744	75.4	76	0.09	85	68	20	402
14	28.934	67.3	44	.....	79	63	14	200
15	28.877	74.7	73	0.02	86	59	12	152
16	28.767	75.3	81	3.25	85	66	30	241
17	29.059	68.7	79	.....	79	66	18	187
18	29.195	66.1	71	.....	72	61	16	140
19	29.120	69.2	70	.....	80	58	16	200
20	28.945	75.6	61	.....	85	64	30	321
21	28.817	75.8	75	0.30	94	69	30	280
22	28.826	73.2	80	0.12	81	71	33	292
23	28.952	71.0	83	.....	79	67	24	330
24	29.035	69.9	84	.....	81	64	10	58
25	29.091	69.9	90	.....	82	62	12	143
26	29.046	76.0	81	.....	87	66	12	154
27	28.953	77.2	78	.....	92	70	12	134
28	28.846	72.5	89	0.81	79	70	18	139
29	28.734	66.7	87	0.08	73	63	20	175
30	28.860	59.5	48	.....	67	51	16	269
31	29.075	53.6	53	.....	61	47	16	249
Sums.	.....	.....	.....	5.05	.....	.....	.....	6,322
Means	28.958	71.1	69.8	.....	.....	.....	.....	.....

Highest barometer, 29.200 inches; lowest, 28.707 inches. Highest temperature, 94°; lowest, 40°. Range of barometer, 0.493 inches. Range of thermometer, 47°. Maximum velocity of wind, 33 miles, from N. W. Prevailing winds, South.

Number of clear days, 15; fair days, 12; cloudy days, 4.

Number of times the wind blew from the N., 8; N. E., 7; E., 2; S. E., 12; S., 32; S. W., 9; W., 3; N. W., 18. (Three observations daily.)

* Rainfall to small to measure.

METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF SEPTEMBER, 1886.

Day.	Observations Taken at 7 A. M., 2 P. M., and 9 P. M. Means refer to Day Ending 12 P. M.			For 24 Hours Ending 9 P. M.			For 24 Hours Ending 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum velocity of the wind.	Total movement of the wind.
	Inches.	°	*Pr. ct.*	*Inches.*	°	°	*Miles.*	*Miles.*
1	29.213	55.1	73	.....	64	46	20	197
2	29.177	63.1	78	.15	72	55	24	280
3	29.079	69.4	71	.....	80	60	33	399
4	29.024	72.9	79	.04	82	68	24	360
5	29.110	73.2	83	.....	82	64	12	203
6	29.151	75.8	82	.....	86	68	18	278
7	29.119	76.1	68	.....	85	67	21	294
8	29.142	64.1	94	.15	77	63	20	256
9	28.850	65.9	94	.40	70	59	11	152
10	28.939	59.5	62	.....	70	55	20	303
11	28.905	59.5	60	.....	72	48	36	362
12	28.904	50.4	56	.....	58	46	26	347
13	28.844	54.8	70	—*	62	43	22	287
14	28.933	54.5	66	.....	66	43	10	104
15	28.766	65.0	74	.....	76	49	28	328
16	28.797	57.1	83	.21	67	54	20	297
17	29.203	53.0	63	.....	61	44	14	211
18	29.133	53.9	80	.22	65	50	16	166
19	29.176	51.7	73	.....	57	48	28	336
20	29.225	54.7	48	.....	63	45	17	170
21	29.051	55.9	87	.01	59	51	20	176
22	28.897	61.9	94	.01	69	54	14	213
23	28.970	69.4	94	.13	80	58	26	173
24	28.981	73.4	78	.....	80	67	30	373
25	28.863	69.7	80	.21	79	66	42	460
26	28.874	64.0	87	.08	72	58	38	283
27	28.858	58.8	78	.68	68	55	14	176
28	29.089	48.9	56	.....	58	40	15	190
29	28.949	52.7	60	.....	64	37	22	263
30	28.904	40.9	52	.....	56	37	32	587
Sums.	.....	.....	.....	2.39	.....	.....	.....	8,224
Means	29.004	60.8	74.6	.....	.....	.....	.....	.....

Highest barometer, 29.261 inches; lowest, 28.633 inches. Highest temperature, 86°; lowest, 40°. Range of barometer, 0.573 inches; range of thermometer, 46°. Maximum velocity of wind, 42 miles. Prevailing winds, S. W. and N. W. Number of clear days, 9; fair days, 15; cloudy days, 6. Number of times wind blew from N., 2: N. E., 2; E., 3; S. E., 5; S., 35; S. W., 11; W., 16; N. W., 16. (Three observations daily.)

* Precipitation too small to measure.

METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF OCTOBER, 1886.

Day.	Observations Taken at 7 A. M., 2 P. M., and 9 P. M. Means Refer to Day Ending 12 P. M.			For 24 Hours Ending 9 P. M.			For 24 Hours Ending 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum velocity of the wind.	Total movement of the wind.
	Inches.	°	*Pr. ct*	*Inches.*	°	°	*Miles.*	*Miles.*
1	29.204	39.3	69	.....	46	34	19	288
2	29.296	45.0	57	.....	57	32	10	113
3	29.132	58.9	59	.....	76	45	24	347
4	29.157	55.2	70	.....	66	51	29	325
5	29.188	51.8	83	.....	64	43	12	130
6	29.083	56.5	77	.....	69	44	12	173
7	29.057	61.3	68	.....	73	50	17	224
8	29.088	63.9	85	.....	76	54	17	270
9	29.088	64.1	74	.....	76	53	19	233
10	29.103	65.2	66	.....	76	56	18	198
11	29.068	67.1	68	0.02	77	59	18	203
12	28.985	67.3	62	.....	80	60	16	289
13	28.731	63.2	94	0.35	70	55	24	247
14	28.501	54.5	79	0.88	68	51	30	281
15	29.285	46.6	64	.....	53	43	24	406
16	29.385	40.3	67	.....	43	31	18	299
17	29.056	46.1	86	.....	56	41	24	273
18	29.215	47.3	88	.....	54	40	20	283
19	29.080	62.7	78	.....	72	45	30	334
20	29.103	53.8	66	0.01	63	46	36	455
21	29.261	51.1	61	.....	62	40	20	278
22	29.158	54.1	57	.....	63	46	16	250
23	28.916	53.7	85	0.95	55	51	20	291
24	28 962	54.4	75	.....	59	50	30	450
25	29.471	38.4	71	.....	55	37	30	440
26	29.502	36.5	77	.....	43	32	20	364
27	29.235	38.8	79	.....	45	32	20	270
28	29.026	43.3	54	.....	53	34	13	233
29	29.145	44.3	61	.....	55	35	12	115
30	29.258	47.6	61	.....	59	39	14	168
31	29.146	51.5	68	.....	65	38	18	192
Sums.	.....	.....	.....	2.21	.....	.....	.....	7,422
Means	29.126	52.4	71.3	.....	.....	.....	.....	.....

Highest barometer, 29.543 inches; lowest, 28.173 inches. Highest temperature, 80°; lowest, 31°. Range of barometer, 1.370 inches. Range of thermometer, 49°. Maximum velocity of wind, 36 miles from S. W. Prevailing winds, S., S. W. and N. W.

Number of clear days, 16; fair days, 11; cloudy days, 4.

Number of times the wind blew from the N., 11; N. E., 4; E., 1; S. E, 7; S., 38; S. W., 14; W., 5; N. W., 13. (Three observations daily.)

METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF NOVEMBER, 1886.

Day.	Observations Taken at 7 A. M., 2 P. M. and 9 P. M. Means Refer to Day Ending 12 P. M.			For 24 Hours Ending 9. P. M.			For 24 Hours Ending 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum velocity of the wind.	Total movement of the wind.
	Inches.	°	*Pr. ct.*	*Inches.*	°	°	*Miles.*	*Miles.*
1	28.951	58.5	51	.....	67	45	25	371
2	28.755	52.3	58	—*	63	49	44	580
3	28.902	43.7	46	.....	52	41	36	420
4	28.857	47.0	52	.....	56	34	45	436
5	29.153	32.7	66	.....	52	30	38	518
6	29.114	27.9	93	—*	32	24	19	220
7	29.160	25.5	100	.....	31	21	18	341
8	28.979	35.1	62	.....	44	22	28	297
9	28.792	39.6	92	0.02	41	31	28	395
10	29.105	39.3	85	.....	43	37	18	190
11	29.316	30.0	75	.....	37	26	20	295
12	29.231	29.7	85	.....	36	25	24	354
13	29.208	38.8	85	.....	39	22	20	146
14	29.212	38.7	50	.....	46	27	15	245
15	29.373	33.6	83	.....	39	31	16	290
16	29.044	34.9	85	—*	39	29	16	185
17	28.682	32.9	92	0.40	42	28	30	400
18	28.495	20.2	93	0.02	29	15	24	507
19	28.875	28.3	89	.....	33	13	24	363
20	28.860	32.3	84	.....	38	26	16	248
21	29.002	34.9	89	.....	42	28	9	92
22	28.590	40.0	92	0.51	50	33	18	288
23	28.452	21.6	78	—*	42	16	32	414
24	28.906	15.0	93	.....	18	10	30	381
25	29.025	17.2	98	.....	28	12	12	202
26	29 226	17.4	100	.....	24	9	10	140
27	29.056	23.6	95	—*	35	11	30	295
28	28.866	23.8	97	0.26	27	16	20	239
29	28.877	12.7	90	.....	29	9	21	331
30	28.813	20.1	93	.....	24	10	10	165
Sums.	.....	.....	.....	1.21	.....	.....	.....	9,348
Means	28.962	31.2	81.7	.....	.....	.....	.....	.....

Highest barometer, 29.401 inches; lowest, 28.194 inches. Highest temperature, 49°; lowest, 9°. Range of barometer, 1.207 inches. Range of thermometer, 40°. Maximum velocity of wind, 45 miles from S. W. Prevailing winds, N. W., W. and S. W.

Number of clear days, 10; fair days, 9; cloudy days, 11.

Number of times the wind blew from the N., 6; N. E., 8; E., 3; S. E., 4; S., 9; S. W., 23; W., 22; N. W., 15. (Three observations daily.)

*Precipitation too small to measure.

METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF DECEMBER, 1886.

Day.	Observations Taken at 7 A. M., 2 P. M., and 9 P. M. Means Refer to Day Ending 12 P. M.			For 24 Hours Ending 9 P. M.			For 24 Hours Ending 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum velocity of the wind.	Total movement of the wind.
	Inches.	°	*Pr. ct.*	*Inches.*	°	°	*Miles.*	*Miles.*
1	29.022	—0.1	88	.....	22	— 5	30	248
2	29.337	—1.5	90	.....	4	—12	16	276
3	29.465	3.3	91	.....	9	— 8	10	66
4	29.571	6.5	88	.....	12	—15	20	287
5	29.285	13.2	75	.....	17	— 2	17	125
6	29.195	21.1	76	.....	28	13	16	182
7	29.125	23.7	82	.....	31	10	16	240
8	29.145	25.6	88	.....	32	15	8	90
9	29.025	36.7	89	.....	41	18	20	248
10	29.029	37.6	93	—*	38	35	33	526
11	29.013	40.9	94	.....	14	35	24	285
12	28.738	39.5	100	0.18	43	37	12	123
13	28.779	26.7	92	0.01	38	14	22	275
14	28.517	19.5	91	0.20	28	11	33	209
15	29.017	5.6	93	.....	12	3	42	416
16	28.958	1.6	97	.....	8	— 8	12	172
17	28.899	12.7	94	0.20	20	0	10	124
18	28.912	14.0	88	.....	20	8	13	188
19	29.098	7.7	92	0.04	18	— 1	12	147
20	28.830	24.9	88	.....	30	— 2	36	334
21	29.104	15.0	86	.....	30	12	25	247
22	29.234	13.1	83	.....	21	4	11	104
23	29.074	23.0	93	.....	29	10	20	159
24	29.048	12.1	94	0.195	24	4	18	151
25	29.021	9.6	100	0.123	14	1	6	32
26	28.983	—1.4	100	0.135	16	—12	12	129
27	29.293	—9.7	95	.....	5	—26	15	166
28	29.357	—1.5	90	.....	6	—11	10	76
29	29.226	2.7	96	0.10	5	— 5	16	78
30	29.146	8.9	93	.....	14	— 4	12	101
31	29.129	9.6	95	0.12	15	3	20	226
Sums.	.....	.....	.....	1.303	.....	.....	.....	6,030
Means	29.084	14.2	90.7	.....	.....	.....	.....	.....

Highest barometer, 29.600 inches; lowest, 28.387 inches. Highest temperature, 44°; lowest, —26°. Range of barometer, 1.213 inches. Range of thermometer, 70°. Maximum velocity of wind, 42 miles from N. W.; Prevailing winds, N. W., S. and S. W.

Number of clear days, 11; fair days, 11; cloudy days, 9.

Number of times the wind blew from the N., 12; N. E., 4; E., 1, S. E., 0; S., 16; S. W., 19; W., 9; N. W., 28; calm, 4 times. (Three observations daily.)

*Precipitation too small to measure.

METEOROLOGICAL OBSERVATIONS FOR THE YEAR 1886.

Month.	Observations Taken at 7 A. M., 2 P. M., and 9 P. M. Means Refer to Day Ending 12 P. M.			For 24 Hours Ending 9 P. M.			For 24 Hours Ending 2 P. M.	
	Mean monthly barometer.	Mean monthly temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum velocity of the wind.	Total movement of the wind.
	Inches.	°	*Pr cent.*	*Inches.*	°	°	*Miles.*	*Miles.*
January...	28.999	11.9	86.8	3.33	35	—24.	38	8,795
February..	28.986	19.7	80.9	2.35	43	—21	40	8,684
March.....	28.931	28.9	79.9	4.67	49	4	36	8,682
April.....	29.004	47.0	73.7	2.48	77	8	40	7,629
May	28.935	59.3	65.7	2.02	83	37	32	6,737
June... ..	28.956	67.6	65.3	1.08	94	44	36	6,218
July	28.966	73.8	60.0	0.79	100	54	35	6,054
August ...	28.958	71.1	69.8	5.05	94	47	33	6,322
September.	29.004	60.8	74.6	2.29	86	37	42	8,224
October...	29.126	52.4	71.3	2.21	80	31	36	7,422
November.	28.962	31.2	81.7	1.21	67	9	45	9,348
December.	29.084	14.2	90.7	1.30	44	—26	42	6,030
Sums	.....	.....	.....	28.78	.....	.....	.....	90,145
Means	28.992	44.8	75.0	.....	.....	.....	.....	.....

Highest barometer, 29.600 inches; lowest, 28.173 inches. Highest temperature, 100 degrees; lowest, —26 degrees. Range of barometer, 1.427 inches. Range of thermometer, 126 degrees. Maximum velocity of the wind, 45 miles from southwest. Prevailing winds, northwest and south. Number of clear days, 136; fair days, 150; cloudy days, 79. Number of times the wind blew from the north, 159; northeast, 91; east, 39; southeast, 80; south, 274; southwest, 145; west, 121; northwest, 212. (Three observations daily.)

IX. SUMMARY OF METEOROLOGICAL OBSERVATIONS TAKEN, AT MADISON, DURING THE YEARS 1853 TO 1886 INCLUSIVE.

The Washburn Observatory takes regular meteorological observations, three times daily, for the purpose of continuing the valuable records which have been kept at the University of Wisconsin since 1853. The results of each month's observations are regularly published in various papers in Wisconsin, as well as in the *Monthly Weather Review* of the U. S. Signal Office, and they are thus available to those interested.

In order to obtain the greatest amount of useful information from these current monthly reports, it is necessary to compare them with the records for past years. It is for this reason that the present summary has been made, which is intended to supersede all previous abstracts.

SOURCES FROM WHENCE THE DATA OF THE FOLLOWING TABLES ARE DERIVED.

All the observations were made tri-daily, at 7 A. M., 2 P. M. and 9 P. M. Many of the original records are now at the observatory. Some, however, have been lost. The tables given below are made up as follows: 1853 January to 1864 June, from the manuscript records, supplemented by the observations given in *Results of Meteorological Observations made under the U. S. Patent Office and the Smithsonian Institution from the year* 1854 *to* 1859 *inclusive, Vol. I;* 1869 January to 1878 October, from manuscript records, supplemented by the annual reports of Prof. W. W. DANIELLS to the Regents of the University; 1878 October to 1883 April, from manuscript records of the U. S. Signal Service Station, at Madison; 1883 April to 1887 January, from manuscript records of observations taken at the Washburn Observatory.

OBSERVERS AND PLACES OF OBSERVATION.

From 1853 January to 1854 June, the observations were made by Prof. S. H. CARPENTER at the North Dormitory, University. From 1854 June to 1856 January, the observations were made by Prof. J. W. STERLING, at the North Dormitory, University. From 1856 March to 1857 January, the observations were made by Dr. A. SCHUE, at his office on Main street, city of Madison. From 1857 January to 1864 May, the observations were made by Prof. J. W. STERLING, at the North Dormitory and the Main Building, University. From 1869 January to 1878 October, the observations were made by Prof. W. W. DANIELLS, at the Main Building, University. From 1878 October to 1883 April, the observations were made by Signal Sergeants F. M. M. BEALL and C. A. SHAW, at Brown's Block, city of Madison. From 1883 May to 1883 August, the observations were made by Mr. J. C. OFFICER, at the North Dormitory, University. Since August 1883 the observations have been made at the Washburn observatory. From 1883 August to 1883 December, by Mr. JOHN TATLOCK, from 1884 January to 1886 June, by Mr. G. W. BROWN, from 1886 July to 1886 December, by Mr. JAMES L. CAREY.

NOTES ON THE OBSERVATIONS.

Besides the special remarks to each table, the following general facts should be noted:

In all cases where the observations were made for a portion of a month only, the rainfall, the number of days on which snow or rain fell, and the movement of wind have been omitted from the monthly means and sums. Up to October, 1879, the maximum and minimum temperatures given, were simply the highest and lowest readings of the thermometer at the regular hours of observation, viz.: 7 A. M., 2 P. M., and 9 P. M. After that date they are read from self-recording instruments. Up to October, 1879, the maximum velocity of the wind is simply the greatest velocity recorded (estimated) by the observer at the hours 7, 2, 9. The maximum velocity during May, June, July, 1883, is the

greatest velocity recorded by the anemometer at the hours 7, 2, 9. During the rest of the series, it is the highest velocity of the 24 hours as read from the anemometer sheets. This is usually computed by selecting that five minutes of the anemometer sheets which contain the greatest number of miles, and by multiplying this by 12. In special cases of very high winds (above 60 miles per hour) a shorter time than five minutes is sometimes taken as a basis for computation. Occasionally the rate of motion of high winds has been deduced by observing the times of consecutive clicks of the anemometer magnet by the mean-time clock.

A careful examination of all the original records has shown that the barometer readings between August, 1877, and October, 1878, are probably erroneous. The monthly means are constantly from 0.1 to 0.4 inches below the means of twenty years' observations for these months. They are accordingly omitted here.

Table I gives the mean monthly barometer at 32°; mean monthly temperature, Fahr.; maximum and minimum recorded temperature for the month; the range of temperature for the month, which is the difference of the maximum and minimum temperatures; the rainfall for the month; the mean monthly relative humidity; the number of days on which rain or snow fell during the month; the prevailing wind of the month; the maximum velocity of the wind during the month; the miles traveled by the wind during the month.

Table II gives a summary of the data of table I, arranged by years, including the years 1869–1886 only, these years being complete.

TABLE I.— METEOROLOGICAL OBSERVATIONS BY MONTHS FROM JANUARY 1, 1853, TO JANUARY 1, 1887.

N. B.— See remarks at end of table.

OBSERVATIONS FOR JANUARY.

Year.	Mean monthly barometer (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature.	Rain or melted snow (inches).	Mean relative humidity (per cent).	No. of days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind (miles pr hr).	Monthly movement of wind (miles).
		°	°	°	°						
1853...	29.242	25.3	....	.....	....	.....	....	....	.....	....	.....
1854...	28.990	13.0	46	—19	65	.....	....	6	S. W.	60	.....
1857...	29.162	5.6	37	—25	62	.....	45	[4]	N. W.	25	.....
1858...	29.018	31.2	54	9	45	1.83	75	3	S. W.	25	.....
1859...	29.040	20.7	42	—12	54	.....	79	4	W.	35	.....
1860...	.....	21.9	44	— 9	53	.....	....	....	W.	25	.....
1861...	28.941	15.0	35	—15	50	0.50	83	7	S.W.	35	.....
1862...	29.046	14.5	36	—22	58	1.50	....	9	W.	25	.....
1863...	28.948	25.7	48	4	44	.....	....	7	S.	25	.....
1864...	29.010	14.8	45	—29	74	0.60	....	3	S.W.	25	.....
1869...	28.961	23.7	42	—11	53	2.69	94	7	S.W.	25	.....
1870...	28.893	17.8	35	—12	47	3.25	86	10	S.W.	35	.....
1871...	28.994	20.7	55	— 2	57	2.32	91	9	N. W.	35	.....
1872...	28.916	17.5	40	—15	55	1.20	90	6	S.W.	12	.....
1873...	28.850	10.9	33	—21	54	1.40	98	8	N.	35	.....
1874...	28.978	13.9	57	—12	69	3.64	90	10	S.W.	25	.....
1875...	29.073	3.6	33	—25	58	0.90	97	13	W.	12	.....
1876...	28.934	24.5	46	— 6	52	2.31	91	10	W.	25	.....
1877...	29.067	12.9	43	—16	59	1.00	87	5	S.W.	14	.....
1878...	.....	25.1	45	— 9	54	0.40	90	3	N. W.	14	.....
1879...	29.055	19.7	46	—22	68	0.79	63	8	N.E.	31	7,276
1880...	28.937	34.5	58	6	52	2.75	73	13	S.	40	8,688
1881...	29.062	12.6	35	—20	55	2.05	74	13	S.	25	6,506
1882...	28.968	22.4	48	— 8	56	1.33	73	13	S.W.	38	7,480
1883...	29.043	8.5	35	—23	58	1.01	72	18	N. W.	25	6,666
1884...	29.074	9.2	42	—27	69	1.68	81	11	N. W.	36	8,986
1885...	29.045	7.0	40	—25	65	2.44	76	10	S.W.	36	8,042
1886...	28.999	11.9	35	—24	59	3.33	87	18	N..W.	38	8,795
Means.	29.009	17.5	42.4	—14.5	60.4	1.77	81.6	8.8	S.W.	33.6	7,805

OBSERVATIONS FOR FEBRUARY.

Year.	Mean monthly barometer (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature.	Rain or melted snow (inches).	Mean relative humidity (per cent).	No. days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind (miles per hr)	Monthly movement of wind (miles).
		°	°	°	°						
1853...	29.011	19.2	46	—10	56	.....	....	7	.....	....	.....
1854...	29.013	24.3	47	— 5	52	.....	....	4	N.W.	45	.....
1857...	29.271	25.0	48	—13	61	1.75	71	6	S. W.	25	.....
1858...	29.088	16.4	39	—13	52	0.59	71	8	N.W.	25	.....
1859...	28.970	24.5	56	— 5	61	.....	71	10	N.W.	25	.....
1860...	.....	23.4	50	—10	60	2.30	....	2	S.	25	.....
1861...	28.862	25.0	50	— 5	55	1.45	80	7	S.	35	.....
1862...	29.005	14.5	43	—18	61	0.38	....	5	W.	25	.....
1863...	29.080	21.7	43	— 8	51	.....	.....	....	S. W.	25	.....
1864...	28.903	22.8	50	—19	69	2.10	....	4	N.W.	35	.....
1869...	28.932	22.9	50	— 1	51	2.35	89	6	N.W.	35	.....
1870...	28.871	20.9	44	—15	59	1.35	88	6	N.W.	35	.....
1871...	28.859	23.7	46	— 4	50	1.43	87	8	S.	35	.....
1872...	28.899	19.2	48	—10	58	0.40	88	3	W.	25	.....
1873...	28.857	15.6	40	—20	60	0.60	95	2	W.	12	.....
1874...	28.995	21.0	41	—10	51	0.95	91	4	S. W.	12	.....
1875...	28.955	3.4	27	—21	48	2.80	83	9	W.	12	.....
1876...	28.934	24.3	51	—12	63	1.60	91	7	S.	12	.....
1877...	29.108	32.6	52	15	37	0.30	86	2	N.	14	.....
1878...	.....	32.8	53	13	40	1.19	82	6	N.	14	.....
1879...	29.042	22.0	46	—12	58	2.54	70	11	N.W.	30	7,842
1880...	28.936	28.2	55	0	55	1.75	70	9	N.W.	35	8,740
1881...	29.047	18.9	44	— 4	48	5.42	76	16	N.W.	40	8,128
1882...	29.052	33.2	64	4	60	1.74	73	11	W.	30	8,008
1883...	29.169	17.0	49	—17	66	1.64	72	16	W.	28	6,112
1884...	28.962	16.9	37	—13	50	2.12	84	19	N.	40	8,247
1885...	28.940	8.2	40	—23	63	0.82	85	8	N.W.	36	5,699
1886...	28.986	19.7	43	—21	64	2.35	80.9	10	N.W.	40	8,684
Means.	28.990	21.4	47.2	—9.1	57.8	1.66	81.0	7.6	N.W.	34.8	7,682

OBSERVATIONS FOR MARCH.

Year.	Mean monthly barometer (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature.	Rain or melted snow (inches).	Mean relative humidity (per cent).	No. days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind (miles per hr)	Monthly movement of wind (miles).
		°	°	°	°						
1853...	28.968	32.3	61	7	54	.....	....	6	N. W.	25	.....
1854...	28.920	36.2	66	10	56	.....	....	5	N. W.	45	.....
1856...	29.080	25 9	52	—6	58	.....	....	....	W.	....	.....
1857...	29.038	27.9	59	0	59	0.78	63	4	S. W.	25	.....
1858...	28.965	36.6	66	4	62	1 94	50	6	N. W.	25	.....
1859...	28.722	36.6	61	24	37	3.07	73	11	N. W.	35	.....
1860...	.....	39.1	65	19	44	2.07	40	4	W.	35	.....
1861...	28.968	29.0	56	9	47	.....	....	6	N.	25	.....
1862...	28.819	28.0	86	6	80	[1.35]	....	[6]	N. E.	25	.....
1863...	28.701	26.0	45	14	31	[1.50]	....	[3]	N.	25	.....
1864...	28.859	32.0	52	4	48	1.40	....	....	N.	60	.....
1869...	28.948	25.5	59	—1	60	0.79	83	10	N. W.	25	.....
1870...	28.934	27.0	42	—8	50	3.85	85	13	N. W.	25	.....
1871...	28.814	35.4	60	20	40	2.96	75	9	W.	35	.....
1872...	28.758	23.8	40	3	37	2.18	82	11	N.	12	.....
1873...	28.886	30.8	52	—5	57	2.07	75	6	N. W.	25	.....
1874...	28.935	29.7	47	10	37	0.95	69	3	W.	25	.....
1875...	28.826	25.1	64	1	63	0.90	70	7	W.	25	.....
1876...	28.955	27.8	58	0	58	2.27	93	10	N. W.	12	.....
1877...	28.988	23.2	50	—1	51	3.40	84	12	N.	12	.....
1878...	.....	44.0	69	28	41	2.43	73	9	N.	12	.....
1879...	28.967	37.7	68	5	63	1.34	66	11	W.	40	8,626
1880...	29.006	36.6	57	7	50	2.11	68	8	W.	35	9,645
1881...	28.872	28.5	49	—1	50	4.34	74	10	N. W.	45	8,561
1882...	28.993	34.4	62	14	48	4.73	75	18	N. W.	34	9,734
1883...	28.995	27.1	53	1	52	0.38	71	10	N. W.	32	7,606
1884...	28.968	27.4	62	—9	71	2.31	78	14	N.	45	8,083
1885...	29.007	24.9	54	—5	59	0.62	74	8	N. W.	45	9,498
1886...	29.509	28.9	49	4	45	4.67	80	11	N. W.	36	8,682
Means.	28.941	30.6	56.8	5.3	54.8	2.10	72.7	8.6	N. W.	39.0	8,803

OBSERVATIONS FOR APRIL.

Year.	Mean monthly barometer (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature.	Rain or melted snow (inches).	Mean relative humidity (per cent.).	No. days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind (miles per hr)	Monthly movement of wind (miles).
		°	°	°	°						
1853...	28.964	44.3	65	27	38	.....	....	9	N. W.	60	.....
1854...	28.987	47.3	79	23	56	.....	....	6	N. E.	25	.....
1856...	28.990	48.0	68	25	43	2.50	....	....	S.	...	.....
1857...	28.947	35.1	63	14	49	1.90	63	11	N. W.	25	.....
1858...	28.771	42.8	77	25	52	4.74	65	13	N. E.	25	.....
1859...	28.890	40.6	68	22	46	3.07	....	8	S. W.	40	.....
1860...	.....	45.3	70	30	40	0.68	61	3	S.	35	.....
1861...	28.853	46.0	74	29	45	.....	....	....	S.	35	.....
1862...	28.993	42.5	62	19	43	2.00	....	9	N.	25	.....
1863...	29.018	47.6	70	27	43	.....	....	....	S.	35	.....
1864...	28.950	43.7	74	34	40	1.40	....	....	N.	35	.....
1869...	28.868	36.7	63	12	51	2.72	75	9	W.	25	.....
1870...	28.949	49.7	78	34	44	0.18	54	3	S.	25	.....
1871...	28.692	46.0	82	33	49	2.00	61	11	S. W.	35	.....
1872...	28.870	45.8	77	23	54	1.82	56	10	S. W.	25	.....
1873...	28.801	42.4	80	29	51	1.26	66	5	N. W.	25	.....
1874...	29.031	36.8	63	13	50	1.26	66	7	N. E.	25	.....
1875...	28.882	43.3	62	11	51	1.87	68	7	S. W.	25	.....
1876...	28.880	49.4	66	30	36	2.65	72	8	S. W.	12	.....
1877...	28.977	45.3	74	18	56	0.00	74	2	N.	12	.....
1878...	.....	52.3	73	40	33	2.97	67	12	S. W.	20	.....
1879...	28.934	48.2	82	12	70	3.33	70	6	S.	48	7,613
1880...	28.883	46.6	78	23	55	5.48	65	13	W.	41	9,758
1881...	28.986	40.9	73	11	62	1.50	71	12	N. W.	28	6,228
1882...	29.009	44.9	78	22	56	4.21	71	13	E.	44	8,613
1883...	.....	.....	....	.....	....	.....	....	....	.....	...	.....
1884...	28.930	43.4	76	25	51	4.51	69	11	N. W.	45	8,874
1885...	28.977	42.0	74	21	53	3.45	78	13	S.	40	9,099
1886...	29.004	47.0	77	8	69	2.48	74	11	S.	40	7,629
Means.	28.924	44.4	76.9	17.4	59.4	2.42	67.2	8.8	S.	40.8	8,259

OBSERVATIONS FOR MAY.

Year.	Mean monthly barometer (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature.	Rain or melted snow (inches).	Mean relative humidity (per cent.)	No. days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind (miles per hr)	Monthly movement of wind (miles).
		°	°	°	°						
1853...	28.963	54.6	81	37	44	.....	....	13	N.W.	60	.....
1854...	28 855	57.5	78	39	39	.....	....	15	S. E.	45	.....
1855...	29.017	61.9	87	34	53	2.60	46	5	N. E.	25	.....
1857...	28.914	53.0	80	23	57	5.28	54	....	S.	35	.....
1858...	28.977	52.7	73	38	35	8.39	67	18	N.W.	25	.....
1859...	29.050	60.5	79	44	35	.....	57	9	S. W.	35	.....
1860...	.....	61.6	81	43	38	2.74	....	14	S.	45	.....
1861...	28.928	53.0	85	34	51	2.10	...	6	E.	35	.....
1863...	28.968	57.6	81	38	43	.....	....	....	N.	45	.....
1864...	28.864	55.0	84	33	51	....	....	3	S.	60	.....
1869...	28.916	54.4	82	41	41	4.90	73	12	N. E.	25	.....
1870...	28.853	65.0	85	49	36	1.09	52	6	S.	25	.....
1871...	28.909	61.0	86	38	48	3.31	61	9	N. E.	25	.....
1872...	28.855	57.5	79	39	40	2.83	61	9	N.W.	12	.....
1873...	28.842	55.2	76	39	37	3.53	66	10	E.	25	.....
1874...	28.893	59.4	90	42	48	2.14	67	7	N. E.	25	.....
1875...	28.858	59.0	83	31	52	2.61	58	8	S. W.	12	.....
1876...	28.969	59.5	83	36	47	5.18	69	15	S. W.	12	.....
1877...	28.991	60.7	83	34	49	1.02	73	2	S.	12	.....
1878...	....	54.6	77	41	36	4.64	70	8	N.W.	14	.....
1879...	28.950	61.0	86	35	51	3.91	60	9	S. E.	36	7,482
1880...	28.936	65.5	86	44	42	4.45	62	15	S.	30	7,344
1881...	28.997	66.2	88	35	53	4.25	68	10	E.	36	5,750
1882...	28.976	51.7	78	33	45	2.89	72	14	N. E.	30	8,346
1883...	28.883	51.5	78	33	45	6 98	81	11	S. W.	....	.....
1884...	28.919	57.1	78	36	42	4.21	67	14	S. W.	32	7,890
1885...	28.898	54.8	84	27	57	1.68	64	9	N.W.	42	7,955
1886...	28.935	59.3	83	37	46	2.02	66	9	S.	32	6,737
Means.	28.928	57.9	83.0	35.0	47.6	3.60	64.2	10.0	S.	34.0	7,358

OBSERVATIONS FOR JUNE.

Year.	Mean monthly barometer (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature.	Rain or melted snow (inches).	Mean relative humidity (per cent.)	No. of days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind (miles per hr)	Monthly movement of wind (miles).
		°	°	°	°						
1853...	28.957	70.0	89	53	36	.....	....	15	S. W.	25	.....
1854...	28.957	67.7	89	44	45	.....	....	11	S. E.	25	.....
1855...	28 927	64.0	88	43	45	[6.44]	[62]	[10]	N. W.	35	.....
1856...	28.950	74.0	96	53	43	3.25	....	....	S. W.	...	.....
1857...	28.846	64.6	85	45	39	2.67	63	4	S.	25	.....
1858...	28.956	70.1	89	49	40	4.72	68	14	S. E.	25	.....
1859...	29.040	64.3	84	39	45	3.33	60	9	S.	25	.....
1860...	.....	67.6	81	52	29	[6.87]	65	[6]	N.	60	.....
1861...	28.953	69.1	85	53	32	.....	....	4	N. W.	35	.....
1863...	29.013	65.0	87	53	34	.....	....	....	N. W.	35	.....
1869...	28.868	62.5	79	49	30	6.24	74	10	S. W.	25	.....
1870...	28.911	72.2	98	53	45	1.92	57	7	N. W.	25	.....
1871...	28 900	69.3	89	54	35	4.93	62	11	W.	35	.....
1872...	28.858	67.0	90	55	35	2.44	64	8	S.	12	.....
1873...	28.862	73.0	89	55	34	5.60	68	9	S. W.	25	.....
1874...	28.878	63.3	92	54	38	2.85	78	9	S. W.	35	.....
1875...	28.793	64.1	80	51	29	3.37	75	7	S. E.	12	.....
1876...	28.801	68.2	87	42	45	4.57	77	7	S. W.	12	.....
1877...	28.866	65.9	83	47	36	4.77	79	7	S.	12	.....
1878...	.....	65.8	86	48	38	4.20	69	8	N.	35	.....
1879...	28.972	67.4	86	42	44	2.80	70	10	S.	22	6,030
1880...	28.938	69.6	87	50	37	9.31	71	16	S. W.	50	6,077
1881...	28.911	66.4	90	49	41	4.15	75	11	E.	36	6,227
1882...	28.889	64.5	87	42	45	7.76	73	17	E.	48	6,412
1883...	28.872	65.2	86	47	39	7.57	84	15	N.	....	.....
1884...	29.031	66.6	85	47	38	5.47	80	10	S.	36	6,131
1885...	28.937	65.2	84	42	42	5.11	73	13	S. W.	45	7,035
1886...	28.956	67.6	94	44	50	1.08	65	7	S.	36	6,218
Means.	28.919	67.2	87.4	45.4	42.0	4.70	70.1	9.4	S. W.	34.2	6,304

OBSERVATIONS FOR JULY.

Year.	Mean monthly barometer (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature.	Rain or melted snow (inches).	Mean relative humidity (per cent.).	No. days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind (miles per hr)	Monthly movement of wind (miles.)
		°	°	°	°						
1853...	29.059	67.8	81	57	24	....	....	6	S. W.	15	.....
1856...	29.030	75.8	97	65	32	2.80	58	....	S. W.	....	.....
1857...	29.036	75.1	95	60	35	[3.00]	61	....	S.	25	.....
1858...	29.080	72.1	85	60	25	2.35	64	7	N. E.	25	.....
1859...	29.060	75.8	93	51	42	2.41	63	3	S.	35	.....
1869...	28.951	69.0	84	59	26	3.63	73	10	N. W.	45	.....
1870...	28.888	73.8	91	58	33	5.25	64	6	S. W.	35	.....
1871...	28.928	71.1	90	56	34	2.11	59	9	W.	35	.....
1872...	28.892	73.4	92	60	32	1.26	65	6	S. W.	25	.....
1873...	28.928	71.7	91	53	38	0.82	68	5	S. W	12	.....
1874...	28.967	75.4	96	62	34	5.19	63	5	S. W.	25	.....
1875...	28.955	73.0	86	62	24	0.97	71	5	S. E.	25	.....
1876...	28.930	74.5	89	61	28	4.14	70	8	S.	25	.....
1877...	28.921	73.0	88	61	27	3.84	73	8	N. W.	12	.....
1878...	.....	74.9	92	61	31	7.56	74	12	S. E.	12	.....
1879...	28.946	74.3	91	55	36	5.91	71	7	S. W.	32	5,449
1880...	28.981	71.9	93	53	40	6.00	72	13	N. W.	25	5,343
1881...	29.016	73.1	92	56	36	9.47	75	10	N.	32	5,321
1882...	29.014	66.8	87	50	37	2.70	74	13	N. W.	22	5,884
1883...	28.928	70.2	89	52	37	8.89	80	12	S. W.	....	.....
1884...	28.907	67.7	85	52	33	8 44	74	12	N. W.	78	6,344
1885...	28.941	75.2	90	52	38	7.30	76	14	S. W.	72	7,152
1886...	28.966	73.8	100	54	46	0.79	60	7	N.	35	6,054
Means.	28.970	72.6	90.8	53.0	37.8	4.31	68.6	8.5	S. W.	37.0	5,935

OBSERVATIONS FOR AUGUST.

Year.	Mean monthly barometer (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature.	Rain or melted snow (inches).	Mean relative humidity (per cent.).	No. days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind (miles per hr)	Monthly movement of wind (miles).
		°	°	°	°						
1853...	28.989	70.3	90	48	42	.....	....	5	S. W.	25	.....
1856...	29.050	70.0	93	59	34	1.58	53	....	W.	....	.....
1857...	29.094	69.5	89	57	32	2.00	59	4	N. W.	25	.....
1860...	.....	67.5	84	55	29	.....	....	[4]	N. W.	45	.....
1869...	29.014	66.9	89	54	35	5.92	79	9	N. W.	25	.....
1870...	28.926	67.1	89	56	33	3.65	65	10	S.	25	.....
1871...	28.915	69.8	91	52	39	3.35	68	9	N. W.	35	.....
1872...	28.949	70.4	90	53	37	2.24	67	7	S. W.	25	.....
1873...	28.957	71.9	91	58	33	2.76	69	5	S. W.	35	.....
1874...	28.970	71.1	93	58	35	1.40	65	6	N. E.	12	.....
1875...	28.947	69.6	86	52	34	2.57	71	6	S.	25	.....
1876...	28.960	73.1	90	56	34	3.42	73	6	S.	25	.....
1877...	.....	67.8	86	59	27	3.76	69	10	N. W.	25	.....
1878...	.....	72.2	86	59	27	4.28	71	10	N. W.	25	.....
1879...	28.953	70.6	90	47	43	0.99	67	8	S.	40	6,054
1880...	29 012	71.0	92	52	40	5.90	74	13	S.	30	5,691
1881...	29.041	73.2	95	52	43	0.56	69	8	S.	32	5,499
1882...	29.006	69.1	87	50	37	6.83	81	15	N.	35	5,502
1883...	29.027	66.1	86	51	35	2.74	78	5	S. W.	36	5,458
1884...	29.009	66.6	85	49	36	4.39	77	14	S.	60	7,157
1885...	28.967	64.2	82	46	36	6.41	78	11	S.	36	6,980
1886...	28.958	71.1	94	47	47	5.05	70	12	S.	33	6,322
Means.	28.986	69.5	88.8	49.2	39.6	3.49	70.1	8.9	S.	37.8	6,083

OBSERVATIONS FOR SEPTEMBER.

Year.	Mean monthly barometer (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature.	Rain or melted snow (inches).	Mean relative humidity (per cent.).	No. of days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind (miles per hr)	Monthly movement of wind (miles).
		°	°	°	°						
1853...	29.020	61.4	87	38	49	.....	....	10	S. W.	45	.....
1854...	29.158	64.9	93	42	51	.....	....	4	S.	25	.....
1857...	29.074	62.9	84	41	43	2.93	62	3	S.	25	.....
1859...	.....	.....	...	.....	....	2.00	....	....	.....	...	.....
1860...	.....	58.5	83	41	42	3.33	73	7	S. E.	35	.....
1861...	29.015	60.0	88	40	48	2.77	....	9	S. W.	25	.....
1863...	29.064	59.3	84	34	50	.....	...	....	S.	35	.....
1869...	29.033	61.8	79	40	39	2.68	73	6	S.	25	.....
1870...	29.030	61.2	83	54	29	4.00	54	11	N. E.	12	.....
1871...	29.045	59.8	88	40	48	0.47	56	4	N.W.	12	.....
1872...	28.854	62.1	89	39	50	5.11	71	10	S. W.	25	.....
1873...	28.930	55.4	87	40	47	2.54	67	7	N.W.	25	.....
1874...	28.961	64.4	90	46	44	5.46	73	13	S. W.	25	.....
1875...	29.009	58.9	81	36	45	2.06	66	14	S.	25	.. ...
1876...	28.835	59.8	79	36	43	3.41	77	8	N.W.	35	.....
1877...	.....	65.8	86	47	39	0.64	71	4	S. W.	12	.....
1878...	.....	62.9	85	42	43	6.54	70	7	S.	45	.....
1879...	29.033	62.0	78	37	41	2.68	73	5	S.	30	7,284
1880...	29.013	60.6	85	40	45	4.44	71	11	S.	30	6,185
1881...	28.908	64.8	92	46	46	8.17	77	16	S.	45	6,864
1882...	29.081	61.5	85	43	42	1.91	79	7	E.	23	5,266
1883...	29.058	56.6	79	38	41	2.39	76	6	S.	36	6,443
1884...	28.975	65.1	86	47	39	4.25	79	11	S.	54	8,412
1885...	28.996	59.9	79	42	37	4.65	76	7	S.	32	7,444
1886...	29.004	60.8	86	40	46	2.29	75	13	S.	42	8,224
Means.	29.004	61.2	83.8	41.6	42.2	3.37	70.9	8.4	S.	36.5	7,106

OBSERVATIONS FOR OCTOBER.

Year.	Mean monthly barometer (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature.	Rain or melted snow (inches).	Mean relative humidity (per cent.).	No. days on which snow or rain fell.	Prevailing wind.	Maximum velocity of wind (miles per hr)	Monthly movement of wind (miles).
		°	°	°	°						
1853...	29.042	46.6	68	21	47	.....	....	5	S. E.	35	.....
1854...	29.045	54.1	80	23	57	.....	...	8	S.	25	.....
1857...	29.093	46.8	72	27	45	2.00	76	5	N. W.	60	.....
1858...	29.050	47.7	74	35	39	1.74	71	9	S. W.	35	.....
1859...	.....	46.8	79	22	57	.....	....	6	N., S.	35	.....
1860...	29.041	49.9	75	33	42	2.23	....	9	N. W.	60	.....
1861...	28.959	49.0	74	30	44	.....	...	6	S.	25	.....
1862...	28.976	50.0	82	22	60	.....	....	...	S.	45	.....
1863...	29.028	40.7	65	29	36	3.25	....	5	S.	60	.....
1869...	28.954	37.7	71	19	52	6.60	65	7	N. W.	25	.....
1870...	28.956	50.4	70	29	41	2.09	75	9	W.	35	.....
1871...	28.885	52 0	80	27	53	3.07	68	8	W.	25	.....
1872...	28.971	49.0	76	30	46	0.60	61	6	N. W.	25	.....
1873...	28.914	45.1	73	20	53	1.96	68	8	S. W.	25	.....
1874...	28.848	51.0	71	30	41	1.44	76	6	S. E.	12	.....
1875...	28.930	46.1	77	27	50	1.96	63	10	S. W.	12	.....
1876...	28.853	45.8	66	23	43	1.59	74	3	S. W.	25	.....
1877...	.....	51.2	78	33	45	4.13	75	13	S. W.	12	.....
1878...	28.959	49.6	74	20	54	3.78	68	15	N. W.	50	8,519
1879...	29.069	58.0	84	24	60	2.50	67	8	S.	30	7,787
1880...	29.011	48.5	75	26	49	1.68	67	6	S.	44	8,069
1881...	29.041	51.6	77	33	44	9.12	80	20	S. E.	24	7,044
1882...	28.975	54.4	78	35	43	4.14	77	8	S.	32	6,456
1883...	29.081	46.3	79	28	51	3.79	80	11	S. E.	48	8,372
1884...	29.063	51.5	80	26	54	4.60	78	9	S.	54	9,196
1885...	28.973	44.8	71	26	45	2.37	77	7	S.	40	8,339
1886...	29.126	52.4	80	31	49	2.21	71	5	S.	36	7,422
Means.	28.998	48.8	78.0	27.4	49.4	3.04	71.8	8.2	S.	38.5	7,912

OBSERVATIONS FOR NOVEMBER.

Year.	Mean monthly barometer (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature.	Rain or melted snow (inches).	Mean relative humidity (per cent.)	No. days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind (miles per hr)	Monthly movement of wind (miles).
		°	°	°	°						
1853...	29.110	38.8	56	14	42	.....	....	13	N. W.	25	.....
1854...	28.860	37.0	65	17	48	.....	....	5	N. W.	25	.....
1856...	28.950	33.1	52	13	39	4.92	71	....	S.	....	.....
1857...	28.838	29.3	57	— 3	60	0.72	71	3	S.W.	60	.....
1858...	29.020	31.7	49	7	42	1.37	86	13	N. W.	35	.....
1859...	.....	36.4	68	19	49	1.39	....	7	N., S.	25	.....
1860...	28.910	33.3	63	— 4	67	1.32	....	9	W.	25	.....
1861...	28.884	37.2	52	23	29	.....	....	....	S.W.	25	.....
1862...	29.041	33.3	52	21	31	.....	....	....	S.	45	.....
1863...	28.967	35.4	56	8	48	2.50	....	4	N. W.	45	.....
1869...	28.862	30.6	60	14	46	2.05	82	10	N. W.	35	.....
1870...	28.924	38.6	64	19	45	0.53	67	5	N. W.	35	.....
1871...	28.965	30.9	58	3	55	2.31	74	6	N.E.	25	.....
1872...	28.900	27.2	54	— 4	58	0.76	85	3	N. W.	25	.....
1873...	28.886	28.2	50	2	48	2.15	85	7	N. W.	25	.....
1874...	28.970	32.6	69	— 3	72	3.29	77	9	W.	25	.....
1875...	28.987	31.0	54	—11	65	0.40	81	6	N.	12	.....
1876...	28.926	34.8	63	14	49	2.31	84	5	N. W.	12	.....
1877...	.....	34.7	47	11	36	2.81	77	11	S.W.	12	.....
1878...	28.968	40.0	58	24	34	0.76	70	6	N. W.	25	6,722
1879...	28.994	33.7	67	11	56	6.02	73	10	S.	40	7,909
1880...	29.084	26.8	60	— 7	67	1.68	72	12	W.	29	7,915
1881...	28.990	34.6	59	6	53	2.56	76	18	W.	32	9,884
1882...	29.087	38.3	66	17	49	2.62	82	11	S.	28	6,894
1883...	28.996	34.5	60	2	58	2.56	77	8	S.	60	10,547
1884...	29.038	32.2	60	— 5	65	1.53	83	11	N. W.	32	7,030
1885...	28.924	35.6	55	22	33	2.74	85	4	N. W.	37	7,071
1886...	28.962	31.2	49	9	40	1.21	82	10	S.W.	45	9,348
Means.	28.965	33.6	59.5	8.5	52.6	2.10	78.0	8.2	N. W.	37.8	8,147

OBSERVATIONS FOR DECEMBER.

Year.	Mean monthly barometer (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature.	Rain or melted snow (inches).	Mean relative humidity (per cent.)	No. days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind (miles per hr)	Monthly movement of wind (miles).
		°	°	°	°						
1853...	28.946	26.0	48	1	47	.....	....	[5]	N. W.	25	.....
1856...	29.038	13.0	35	−10	45	[3.25]	60	[8]	W.	45	.....
1857...	29.021	30.8	48	17	31	0.75	84	4	S. W.	25	.....
1858...	29.016	22.5	40	−11	51	.....	82	3	S. W.	35	.....
1860...	29.054	19.0	35	— 6	41	1.00	91	5	N. W.	25	.....
1861...	29.194	25.5	49	2	47	[0.50]	....	[3]	S. W.	25	.....
1862...	29.025	27.3	46	5	41	.....	.....	....	S. W.	25	.....
1863...	28.994	21.5	39	−15	54	1.70	....	6	N. W.	35	.....
1869...	28.993	22.3	39	— 2	41	2.64	89	7	W.	25	.....
1870...	28 910	22.1	48	−13	61	0.67	87	7	W.	35	.....
1871...	28.926	13.4	39	−15	53	1.15	87	10	W.	12	.....
1872...	29.043	9.5	38	−28	66	1.60	96	8	N. W.	35	.....
1873...	28.998	26.0	43	2	41	1.80	88	8	S. E.	25	.....
1874...	28.977	22.6	50	−15	65	0.45	84	6	N. W.	12	.....
1875...	28.790	31.9	54	−11	65	2.18	87	8	N. W.	12	.....
1876...	29.064	11.1	41	−22	63	2.59	70	6	N. W.	25	.....
1877...	.....	38.7	57	23	34	2.01	80	8	S. W.	12	.....
1878...	28.965	22.0	39	— 8	47	0.79	66	8	W.	29	7,391
1879...	29.005	21.1	54	−12	66	2.29	74	15	W.	30	7,873
1880...	29.036	17.0	40	−21	61	1.17	75	19	W.	32	7,402
1881...	29.036	33.1	49	6	43	1.32	74	14	S.	40	8,330
1882...	29.025	21.7	43	−13	56	2.03	78	20	N. W.	38	6,853
1883...	29.009	22.3	51	−11	62	1.95	82	9	N. W.	40	8,934
1884...	29.032	16.8	43	−20	63	5.68	85	17	N.	40	7,633
1885...	28.979	23.7	51	−13	64	3.59	87	10	N. W.	60	8,822
1886...	29.084	14.2	44	−26	70	1.30	91	11	N. W.	42	6,030
Means.	29.006	22.2	46.8	−8.3	60.6	1.84	81.6	9.0	N. W.	40.2	7,429

REMARKS TO ACCOMPANY TABLE I.

January; 1857, 23 days observations only.

January; 1860, 20 days observations only.

March; 1862, 27 days observations only.

March; 1863, 26 days observations only.

April; 1883, no observations.

May; 1864, 16 days observations only.

May; 1883, 26 days observations only for the barometer, mean temperature and rainfall; and 21 days only for the maximum and minimum temperature.

June; 1855, 19 days observations for barometer, and 28 days for the other entries.

June; 1860, 26 days observations only.

June; 1863, 25 days observations only.

July; 1857, 20 days observations only.

August; 1860, 23 days observations only.

November; 1861, 26 days observations only.

November; 1863, 24 days observations for barometer.

December; 1856, 23 days observations only.

December; 1861, 20 days observations only.

December; 1853, 23 days observations only.

In all cases where the observations were given for a portion only of the month, the rainfall, No. of days of rain or snow, and the movement of wind have been omitted from the means and sums.

The mean barometer, temperature, rainfall, relative humidity, No. of days of snow or rain, and prevailing winds are derived from the whole series 1853–1886.

The mean highest temperature, the lowest, the range, the mean maximum velocity of the wind, and the monthly movements of the wind are derived from the data of the years 1879–1886 only, for reasons previously given.

TABLE II.—SUMMARY OF METEOROLOGICAL OBSERVATIONS FROM 1869 TO 1886 INCLUSIVE, BY YEARS.

N. B.—See remarks at end of the table.

YEAR.	Mean yearly barometer. (Inches.)	Mean yearly temperature.	Highest temperature of the year.	Lowest temperature of the year	Range of temperature for the year.	Rain or melted snow. (Inches.)	Mean relative humidity. Per cent.	No. days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind. (Miles per hour.)	Yearly movement of wind. (Miles.)
		°	°	°	°						
1869	28.966	42 9	89	—11	100	43.27	79.2	103	N. W.	45	....
1870	22.920	47.2	98	—13	111	27.83	69.5	93	N. W	35	....
1871	28.903	46 1	91	—15	106	29.51	70.7	103	W.	35	.....
1872	28.897	44.4	92	—23	120	22.44	73.9	87	S. W. N. W.	35	.....
1873	28.893	43.8	91	—21	112	26.49	76.5	80	N. W. S. W.	35	.....
1874	28.950	45.5	96	—15	111	29.02	74.1	85	S. W.	35	.....
1875	28.917	42.4	86	—25	111	22.59	74.2	100	W. S. W	25	.....
1976	28.921	46.1	90	—22	112	36 04	78 3	93	N W. S. W.	35	... .
1877	.....	47.7	88	—16	104	27.67	77.3	84	S. W.	25	.....
1878	....	49.7	92	— 9	101	39.54	71.7	104	N. W.	50	[93,132]
1879	28.993	47.9	91	—22	113	35.10	68.7	108	S.	48	87,425
1880	28.989	48.1	93	—21	114	46 72	70 0	138	S. W.	50	90,855
1881	29.001	46.9	95	—20	115	52.92	72.4	158	N. W. S.	45	84,312
1882	29.005	47.1	87	—13	100	42.89	75 3	160	N. W. W.	48	85,448
1883	29.003	47 3	89	—23	112	39.84	77.9	121	N. W. S.	60	[60,138]
1884	28.993	43 4	86	—27	113	49.19	77.8	144	S.	78	93,983
1885	28.969	42.1	90	—25	115	40.58	77.2	114	S. N. W.	72	93,126
1886	28 992	44.8	100	—26	126	28 78	73 0	115	N. W. S.	45	90,145
Means.	28 957	45.4	90.3	—22 2	113.5	35 58	74.4	110	N. W.	55.8	89,332

REMARKS—For 1878, the maximum velocity of the wind and No. of miles traveled were observed for October, November, December, only.

For 1883, the same data are for 238 days only; the maximum and minimum Thermometer, and Range of Temperature for 333 days. The other data for 328 days.

The mean Barometer, temperature, rainfall, humidity, No. of days on which snow or rain fell, are given from all the data 1869–1886. The *mean* highest and lowest temperature, the range, and the maximum velocity and number of miles traveled by the wind, relate only to the years 1879–1885.

TABLE III.—SUMMARY OF THE PRECEDING METEOROLOGICAL OBSERVATIONS BY MONTHS.

MONTH.	Mean monthley barometer (inches). 1853—1886.	Mean monthly temperature. 1853—1886.	Mean maximum temperature. 1879—1886.	Mean minimum temperature. 1879—1886.	Mean monthly range of temperature. 1879—1886.	Mean monthly fall of rain or melted snow (inches). 1853—1886.	Mean relative humidity (per cent.). 1855—1886.	Mean number of days on which rain or snow fell. 1853—1886.	Mean direction of wind. 1853—1886.	Mean maximum velocity of wind (miles per hour). 1879—1886.	Mean monthly movement of the wind (miles). 1870—1886.
		°	°	°	°						
January.	29.009	17.5	42.4	—18.0	60.4	1.77	81.6	8.8	S. W.	33.6	7,804
February	28.990	21.4	47.2	—10.6	57.8	1.66	81.0	7.6	N.W.	34.8	7,682
March ..	28.941	30.6	56.8	2.0	54.8	2.10	72.7	8.6	N.W.	39.0	8,803
April ...	28.924	44.4	76.9	17.4	59.4	2.42	67.2	8.8	S.	40.8	8,259
May	28.928	57.9	83.0	35.0	47.6	3.60	64.2	10.0	S.	34.0	7,358
June	28.919	67.2	87.4	45.4	42.0	4.70	70.1	9.4	S. W.	34.2	6,304
July	28.970	72.6	90.8	53.0	37.8	4.31	68.6	8.5	S. W.	37.0	5,935
August..	28.986	69.5	88.8	49.2	39.6	3.49	70.1	8.9	S.	37.8	6,083
Sept.....	29.004	61.2	83.8	41.6	42.2	3.37	70.9	8.4	S.	36.5	7,106
October .	28.998	48.8	78.0	27.4	49.4	3.04	71.8	8.2	S.	38.5	7,912
Nov.....	28.965	33.6	59.5	6.8	52.6	2.10	78.0	8.2	N.W.	37.8	8,147
Dec.....	29.006	22.2	46.8	—13.8	60.6	1.84	81.6	9.0	N.W.	40.2	8,752
Means...	28.970	45.6	....	.....	50.4	2.87	73.2	8.7	S.	37.0	7,512
Sums ...	.....	....	....	.....	....	34.40	....	104.4	.....	.....	90,145

TABLE IV.—DATES OF OPENING AND CLOSING OF THE LAKES AT MADISON, 1856–1886, INCLUSIVE.

YEAR.	MONONA.		MENDOTA.
	Opened.	Closed.	Opened.
1856	April 7	December 4	
1857	May 4	November 17	
1858	March 26	December 11	
1859	March 15	December 6	March 14.
1860	March 18	December 5	March 18.
1861	April 10	December 1	April 10.
1862	April 13	November 7	April 14.
1863	April 1	December 7	April 16.
1864	April 20	December 9	April 21.
1865	April 5	December 14	April 5.
1866	April 18	December 12	April 18.
1867	April 19	December 14	April 20.
1868	March 31	December 10	March 31.
1869	April 15	November 24	April 16.
1870	April 11	December 22	April 12.
1871	April 1	November 30	April 1.
1872	April 20	November 28	April 20.
1873	April 17	November 29	April 18.
1874	April 14	December 12	April 14.
1875	April 14	January 10, 1876	April 15.
1876	April 10	December 5	April 10.
1877	April 15	January 7, 1878	April 15.
1878	March 10	December 16	March 9.
1879	April 10	December 16	April 12.
1880	March 18	November 23	March 25.
1881	May 1	January 1, 1882	May 3.
1882	March 19	December 7	March 21.
1883	April 13	December 17	April 13.
1884	April 15	December 17	April 15.
1885	April 17	December 7	April 20.
1886	April 17	December 5	April 19.

APPENDIX.

ADDITIONAL OBSERVATIONS WITH THE REPSOLD MERIDIAN CIRCLE FOR THE DETERMINATION OF THE LATITUDE, AND ERRORS OF THE INSTRUMENT IN DECLINATION.

THE LATITUDE.

BY MR. MILTON UPDEGRAFF.

Another group of fundamental stars was observed during April and May, 1887, for the determination of the latitude, and errors of the instrument in declination. Fourteen pairs were observed, with a mean zenith distance, without regard to sign, of 40°. The entire list was observed on nine nights, five times circle West and four times circle East. The dates of the observations, with the positions of the circle and the temperatures, are given in the table.

Date.	Circle.	Temp.	Date.	Circle.	Temp.
April 18,	W.	41°	May 7,	E.	65°
25,	W.	37	9,	E.	71
30,	W.	62	10,	W.	72
May 3,	E.	54	12,	W.	70
6,	E.	62			

In order to make the conditions more favorable for the elimination of the flexure, and the error of the refraction tables, it was determined to make the mean temperatures circle W. and circle E., as nearly equal as possible. For this reason the observations of April 25, were not reduced for latitude, the other eight nights only, being used. Leaving out April 25, the mean temperature at which the observations were made is +61° circle West and +63° circle East.

The conditions under which the observations were made were unusually good. On each night the external temperature fell slowly and uniformly, and was followed closely by the temperature inside the observing room. The difference was usually about one or two degrees. The seeing was always good, and the observations of the nadir point were very satisfactory. Five nadirs were observed on each night.

The microscopes were read by Miss LAMB, the pointings of the telescope were made by Mr. UPDEGRAFF, and the methods of observation and reduction, described on pp. 61-63 have been strictly followed. The results show that if the lake has any influence on the refraction, it must be very small.

GROUP IV.

Observed during April and May, 1887. *M. U., Observer.*
Stars North of Zenith.

Stars.	R. A.	Z. D.	Mean φ circle West.	Mean φ circle East.	φ Circle W minus φ circle E
	h. m.	° ′	″	″	″
χ Urs. Maj.....	11 40	— 9 58	37.15	35.69	+1.46
37 Urs. Maj ...	10 28				
δ Urs. Maj.....	12 10	—14 35	36.73	35.50	+1.23
8 Draconis	12 51	—22 58	36.60	35.48	+1.12
λ Draconis	11 25	—26 52	37.58	35.28	+2.30
GR. 2001.....	13 23	—29 54	36.68	35.83	+0.85
9 H. Draconis	10 25	—33 13	36.70	35.38	+1.32
BR. 1508	10 51	—35 17	37.45	35.68	+1.77
30 H. Camel.....	10 17	—40 3	37.30	36.45	+0.85
Polaris S. P	13 17	—48 12	36.50	35.74	+0.76*
43 H. Cephei S. P.	12 53	—51 15	36.25	35.72	+0.53
γ Cephei S. P.....	11 35	—59 54	37.70	36.62	+1.08
21 Cassiop. S. P..	12 38	—62 32	37.20	35 62	+1.58
31 Cephei S. P....	10 33	—63 50	37.50	35.72	+1.78
ι Cephei S. P.....	10 46	—71 16	36.88	35.62	+1.26
Means.....	... .	—40 42	37.02	35.74	+1.28
			36″.38		

Stars South of Zenith.

	h. m.	° ′	″	″	″
42 Leonis Min	10 40	+11 48	38.15	36.90	+1.25
43 Comae	13 7	+14 37	37.85	36.85	+1.00
24 Comae	12 29	+24 4	38.10	37.12	+0.98
θ Leonis.....	11 8	+27 1	38.75	37.00	+1.75
ε Virginis.....	12 57	+31 30	38.35	37.28	+1.07
o Virginis.....	11 59	+33 42	38.28	37.48	+0.80
l Leonis.....	10 43	+31 56	37.88	36.58	+1.30
β Virginis..... ..	11 45	+40 40	37.50	37.10	+0.40
θ Virginis.....	13 4	+48 0	37.70	36.98	+0.72
α Virginis.....	13 19	+53 38	38.12	36.30	+1.80
δ Corvi	12 24	+58 56	37.73	35.68	+2.05
δ Crateris	11 14	+57 13	37.28	36.35	+0.93
β Crateris	11 6	+65 15	36.68	35.98	+0.70
ξ Hydrae.....	11 27	+74 16	37.63	36.22	+1.41
Means.....	.....	+40 54	37.86	36.70	+1.15
			37″.28		

W — E = +1.″22.

S — N = +0. 90.

*The corrections for division errors of the Polaris lines have been applied.

Stars.	R. A.	Z. D.	Mean φ circle West.	Mean φ circle East.	$\frac{W+E}{2}$	Seconds of Latitude.
	h. m.	° ′	″	″	″	″
χ Urs. Maj	11 40	} — 9 58	37.15	35.69	36.42	36.97
37 Urs. Maj	10 28					
42 Leonis Min ..	10 40	+11 48	38.15	36.90	37.52	
δ Urs. Maj.....	12 10	—14 35	36.73	35.50	36.12	36.73
43 Comae	13 7	+14 37	37.85	36.85	37.35	
8 Draconis	12 51	—22 58	36.60	35.48	36.04	36.82
24 Comae	12 29	+24 4	38.10	37.12	37.61	
λ Draconis	11 25	—26 52	37.58	35.28	36.43	37.15
θ Leonis.....	11 8	+27 1	38.75	37.00	37.88	
Gr. 2001.....	13 23	—29 54	36.68	35.83	36.26	37.04
ε Virginis.....	12 57	+31 30	38.35	37.28	37.81	
9 H. Draconis ..	10 25	—33 13	36.70	35.38	36.04	36.96
o Virginis.....	11 59	+33 42	38.28	37.48	37.88	
Br. 1508	10 51	—35 17	37.45	35.68	36.56	36.90
l Leonis.....	10 43	+31 56	37.88	36.58	37.23	
30 H. Camel....	10 17	—40 3	37.30	36.45	36.88	37.09
β Virginis.....	11 45	+40 40	37.50	37.10	37.30	
Polaris S. P....	13 17	—48 12	36.50	35.74	36.12	36.73
θ Virginis	13 4	+48 0	37.70	36.98	37.34	
43 H. Cephei S.P	12 53	—51 15	36.25	35.72	35.98	36.60
α Virginis	13 19	+53 38	38.12	36.30	37.21	
γ Cephei S. P..	11 35	—59 54	37.70	36.62	37.16	36.93
δ Corvi	12 24	+58 56	37.73	35.68	36.70	
21 Cassiop. S. P.	12 38	—62 32	37.20	35.62	36.41	36.61
δ Crateris.....	11 14	+57 13	37.28	36.35	36.81	
31 Cephei	10 33	—63 50	37.50	35.72	36.61	36.47
β Crateris S. P.	11 6	+65 15	36.68	35.98	36.33	
ι Cephei S. P...	10 46	—71 16	36.88	35.62	36.25	36.59
ξ Hydrae.....	11 27	+74 16	37.63	36.22	36.92	
Means	.....	+ 0 6	37.44	36.22	36.83	36.83

Mean Z. D. of Stars North of Zenith = —40° 42′.
Mean Z. D. of Stars South of Zenith = +40° 54′.
Mean Z. D of all. = + 0° 6′.

The latitude, uncorrected for difference of division errors of the nadir lines, from

Group I	=43° 4′	36.″81 ± 0.″05	12 pairs.
Group II	=43° 4′	36. 81 ± 0. 05	13 pairs.
Group III	=43° 4	36. 75 ± 0. 04	13 pairs.
Group IV	=43 4	36. 83 ± 0. 04	14 pairs.,

the simple mean of the results of the various pairs being taken.

The mean of all 52 pairs is 36″.798 ± 0″.022 each pair being given the same weight.

The mean zenith distance of all the pairs is +0° 12′, and pairs were observed at all zenith distances.

The limits of Right Ascension of the four groups are for:

	h.	m.		h.	m.
Group I	17	3	to	20	38
Group II	21	22	to	0	57
Group III	4	50	to	7	27
Group IV	10	17	to	13	23

This latitude is the result of 737 observations of 104 stars and represents AUWER'S system for this instrument.

The latitudes derived from the various zenith distances are shown in the table below:

0°—10°	36.″75 ± 0.″06	11 pairs.
10 —20	36. 81 ± 0. 04	11 pairs.
20 —30	36. 82 ± 0. 04	8 pairs.
30 —40	36. 86 ± 0. 06	7 pairs.
40 —60	36. 83 ± 0. 06	6 pairs.
60 —70	36. 81 ± 0. 08	4 pairs.
70 —75	36. 71 ± 0. 08	5 pairs.

It still remains to assign the proper weights to the different pairs and combine them for the final value of the latitude. The results of each of the 52 pairs of Groups I, II, III, and IV, are printed in the table below, with such data as are available, for computation of the weights.

Stars.	Mean zenith distance	No. of Observations		Prob. error of Decl		Weight	Seconds of Latitude.
		N. star.	S. star.	N. star.	S. star.		
	° ′			″	″		″
ψ^5 Aurigae	0 37	6	....	....	....	6	36.78
g Cygni, 13 Lacertae	2 24	5	6	....	....	8	36.30
β Aurigae, ν Aurigae	2 54	6	6	0.09	0.21	6	36.39
o^1 Cygni, γ Cygni	3 15	8	9	0.12	0.09	9	36.76
α Aurigae, μ Aurigae	3 46	5	5	0.06	....	8	37.02
π^2 Cygni, 74 Cygni	4 26	6	5	....	0.24	5	36.28
ι Herculis, π Herculis	4 34	11	7	...	0.11	8	37.02
7 Lacertae, μ Andromedae	5 54	7	7	....	0.12	9	36.88
9 Cygni, 15 Cygni	6 26	8	10	0.11	....	9	36.91
o Aurigae, ι Aurigae	8 24	6	4	....	0.08	8	36.66
β Draco., β Lyrae	9 35	9	9	0.07	0.06	10	37.24
8 Lacertae, δ Androm	10 42	7	7	....	0.19	6	36.91
(χ Urs. Maj., 37 Urs. Maj.) 42 Leonis Minoris	10 53	8	8	0.11	....	9	36.97
ζ Cassiop., η Pegasi	11 49	7	6	0.13	0.11	7	36.99
ν^1 Draco., ζ Cygni	12 45	9	8	....	0.07	10	36.50
15 Lyncis, α Geminorum	13 8	5	5	....	0.07	8	36.84
ξ Draco., ξ Herculis	13 49	11	10	0.16	....	8	36.82
Br. 3077, α Androm	14 2	6	7	....	0.06	9	37.04
δ Urs. Maj., 43 Comae	14 36	8	8	0.11	....	9	36.73
b Draco., μ Herculis	15 28	11	12	....	0.07	10	36.68
ρ Cassiop., 16 Pegasi	15 44	7	6	....	0.08	9	36.54
10 Camel., η Geminorum	18 52	5	6	....	0.10	8	36.88
36 Draco., 109 Herculis	21 19	11	12	....	....	9	36.56
ζ Draco., 110 Herculis	22 42	8	6	0.11	0.18	6	36.66
8 Draco., 24 Comae	23 31	8	8	....	...	9	36.82
ι Cephei, φ Pegasi	23 33	6	7	0.10	0.15	7	36.81
43 Camel., ζ Geminorum	24 8	5	5	....	0.11	7	36.96

Stars.	Mean zenith distance.		No. of Observations		Prob. error of Decl.		Weight.	Seconds of Latitude.
			N. star.	S. star.	N. star.	S. star.		
	°	′			″	″		″
22 Camel, γ Geminorum	26	26	6	6	....	0.07	9	36.58
λ Draco., ϑ Leonis	26	56	8	8	0.09	0.18	7	37.15
β Cephei, α Pegasi	27	44	4	6	0.07	0.06	9	36.98
Gr. 2001, ε Virginis	30	42	8	8	....	....	8	37.04
Gr. 966, φ Orionis	32	46	5	6	....	....	7	36.42
9 H. Draco., oVirginis	33	28	8	8	...	0.09	8	36.96
Br. 1508, l Leonis	33	36	8	8	....	....	8	36.90
Br. 6, ε Piscium	34	30	7	6	....	0.07	8	37.00
19 H. Camel., α Orionis	35	51	5	6	....	0.06	7	37.08
23 H. Camel., 8 Monocerotis	37	32	6	6	....	....	8	36.66
76 Draco., ϑ Serpentis	39	0	8	11	....	....	8	37.04
30 H. Camel, β Virginis	40	22	8	8	....	0.09	9	37.09
Polaris S. P., ϑ Virginis	48	6	8	8	0.06	0.07	10	36.73
43 H. Cephei, α Virginis	54	26	8	8	...	0.06	9	36.60
γ Cephei S. P., δ Corvi	59	25	8	8	....	....	9	36.93
21 Cassiop., S. P., δ Crateris	59	52	8	8	0.12	0.08	8	36.61
Gr. 966, S. P., υ Capricorni	61	46	4	11	....	....	6	36.97
31 Cephei, S. P., β Crateris	64	32	7	8	....	....	7	36.47
f Draco. S. P., ε Leporis	67	8	5	5	....	....	5	36.98
3 Draco. S. P., c^2 Aquarii	67	10	7	7	....	....	7	36.82
δ Draco. S. P., ε Canis Maj	70	38	4	5	....	0.11	4	36.53
Gr. 1771 S. P., δ Sculpt	71	52	7	7	....	....	5	37.08
z Cephei S. P., ξ Hydrae	72	46	8	7	0.10	....	6	36.59
76 Urs. Maj. S. P., α Pis. Aust.	73	24	7	6	....	0.12	5	36.85
17 Camel. S. P., γ Sagittarii	73	42	9	11	....	0.18	5	36.50

The two stars 13 Lacertae and 74 Cygni give values of the latitude which are too small by more than 1″ as may be seen by inspection of the South Stars of Group II. This discordance is so marked that I have thought best not to use the pairs to which these stars belong in the discussion for weights. They have been included however, with the weights assigned them in taking the means for deriving the latitude.

In computing the weights account has been taken of three classes of errors by which the result of each pair is affected.

(1.) Errors of observation, which depend upon the number of observations and the zenith distance.

(2.) Errors of the declinations of the stars.

(3.) Errors of division, and errors arising from imperfect elimination of the flexure and refraction.

The errors of the first class were obtained by computing the probable accidental error of a single *observation* of a star from the nadir in one position of the circle for each ten degrees of zenith distance, from the stars of Groups II, III and IV. This probable error includes the accidental error of bisection of the star, irregularities of refraction, flexure etc., and does not include division errors, (since the same divisions were always used for the same star in the same position of the instrument) nor, of course, errors of the declinations. These probable errors are given in Table I.

TABLE I.

	Probable error of one observation.	Number of observations.	Number of Stars.
0°—10°	±0″.245	106	17
10—20	±0.262	96	15
20—30	±0.262	94	15
30—40	±0.296	111	15
40—60	±0.287	132	18
60—70	±0.389	99	15
70—75	±0.473	93	13

The stars were observed on the average 7 times each, which is more than 3 times in each position of the circle and the mean probable error of *observation* of a single pair is the probable error given in Table I divided by the square

root of 12. This probable error for the various zenith distances is given in the 3d column of Table II.

The probable errors of the declinations have been taken from "Boss' Catalogue of 500 Stars" in case of those stars which are to be found there. Only about half of the stars are in Boss and the mean of the probable errors of these is $\pm 0.''10$. In default of more reliable data I have adopted $\pm 0.''10$ as the probable error of the stars not found in Boss. The probable error of the mean of two declinations is then $\pm 0.''07$ and is given in the 4th column of Table II.

The probable error of the latitude from a single pair as found from the actual agreement of the pairs among themselves is given in the sixth column of Table II. If we assume that no other errors exist, the square of this probable error should be equal to the sum of the squares of the probable errors of (1) the mean of 12 observations, (2) the mean of two declinations, and (3) of the mean of 16 divisions of the circle. It becomes possible, therefore to compute the probable error of the mean of 16 divisions plus such other errors as have not been accounted for. The resulting values of this residual error are in the 5th column of Table II. The mean of this column $\pm 0.''09$ is adopted as that part of the probable error of the latitude from a single pair, due to errors of division, imperfect elimination of the refraction, flexure, etc.

TABLE II.

Z. D.	Probable error of one observation of star from nadir $=\varepsilon_1$	Probable error of 12 observations of star from nadir.	Probable error 2 declinations $=\varepsilon_2$	Probable error of 16 divisions, etc. $=\varepsilon_3$	Probable error of φ from one pair $=\varepsilon_0$	No. of pairs.
	″	″	″	″	″	
0°—10°.	±0.25	±0.07	±0.07	±0.12	±0.16	9
10—20..	±0.26	±0.08	±0.07	±0.08	±0.13	11
20—30..	±0.26	±0.08	±0.07	±0.08	±0.13	8
30—40..	±0.30	±0.09	±0.07	±0.11	±0.16	7
40—60..	±0.29	±0.08	±0.07	±0.10	±0.15	6
60—70..	±0.39	±0.11	±0.07	±0.09	±0.16	4
70—75..	±0.47	±0.14	±0.07	±0.07	±0.17	5

If ε_1=the probable error of observation of a pair, ε_2=the probable error of the mean of two declinations, n=the number of observations; and if $\pm 0''.09$ be taken as the probable error of a pair due to errors of division, then we have as the probable error of the latitude from a single pair—

$$\varepsilon^2_0 = \frac{\varepsilon^2_1}{n} + \varepsilon^2_2 + 0''.008.$$

The formula for the weights is therefore

$$\text{Weight} = \frac{C}{\frac{\varepsilon^2_1}{n} + \varepsilon^2_2 + 0.008}$$

The general mean of all 52 pairs is $36''.8052 \pm 0.021$, and applying the correction for half the difference of division errors of the nadir lines, $-0''.010 \pm 0''.014$, we have as the final result of this determination of the latitude of the meridian circle

$$43^\circ\ 4'\ 36''.80 \pm 0''.025$$

THE ERRORS IN DECLINATION OF THE MERIDIAN CIRCLE.

When the latitude is known, it becomes an easy matter to deduce from observations of fundamental stars from the nadir the errors of the instrument in declination for the various zenith distances. If these errors are not too variable they may be determined with considerable accuracy by means of the excellent star places of the *Berliner Jahrbuch.* It was shown on page 68 that they are not the same for Group I that they are for Groups II and III. More than a year elapsed between the observation of Group I and that of Group II and during the interval both the object-glass and eye-end of the telescope were taken out and replaced. The temperatures also were widely different.

In order to determine whether the observations of Groups II, III and IV may be used together for a determination of the errors of the instrument in declination, I have found the quantities W—E and S—N for each Group from those pairs used for latitude which have nearly the same mean zenith distance in each Group. The corrections for division errors of the nadir have been applied, so that the quantity W—E must consist chiefly of difference of flexure, for the same star in the two positions of the circle.

	W—E.	S—N.	No. of Pairs.	Mean Z. D.	Temp. Fahr.	Time of Observation.
Group II,	+0″.55	+1″.53	5	23°	23°	Nov.-Dec., 1886
Group III,	+0 .50	+1 .52	7	27°	31°	Feb.-Mar., 1887
Group IV,	+0 .48	+1 .24	8	27°	62°	April-May, 1887

The above data indicate that the difference in time and in temperature has caused no considerable change in the instrumental errors in declination within the limits of zenith distance $10° - 40°$ from which the pairs used in the above table have been chosen.

Assuming that no such change has taken place at other zenith distances MISS LAMB has found for all stars observed

in groups II, III and IV, that correction which when applied to the latitude from each star in each position of the circle will produce (the division errors of the nadir being allowed for) the adopted value of the latitude 43° 4′ 36″.80. The means of these corrections for each ten degrees of zenith distance are shown in the table, with their probable errors, in order to give some idea of the degree of accuracy with which they have been determined.

Z. D.	h_1; From N. Stars Circle W. and S. Stars Circle E.	h_2; From N. Stars Circle E. and S. Stars Circle W.	Mean Z. D.	Number of Stars.
° °	″ ″	″ ″	°	
0—10	+0.21±0.07	+0.62±0.10	4.1	17
10—20	+0.51±0.05	+0.81±0.04	18.7	14
20—30	+0.39±0.07	+1.24±0.06	25.4	13
30—40	+0.60±0.07	+1.02±0.08	34.5	17
40—50	+0.41±0.06	+0.62±0.11	44.1	10
50—60	−0.06±0.12	+0.57±0.11	56.3	8
60—70	+0.06±0.09	+0.12±0.10	66.0	11
70—75	+0.26±0.17	+0.18±0.20	73.2	10

The signs are given for North stars. These corrections should be the same numerically for South stars, Circle E., that they are for North stars, Circle W., at the same zenith distance, and the same is true for South stars, Circle W., and North stars, Circle E. The corrections from the North and South stars have been compared, and agree within the limits of accidental error.

The individual results have been plotted in two curves, and the corrections given in the following table have been read from these curves. The corrections are to be applied to the circle readings and are to be used in the reduction of stars, both differentially and from the nadir. In the reduction of stars from the nadir the division errors of the nadir lines must be applied. See page 33.

REPSOLD MERIDIAN CIRCLE; CORRECTIONS TO CIRCLE READINGS.

Circle West.			Circle East.		
Z. D.	North stars.	South stars.	North stars.	South stars.	Z. D.
°					°
0	−0″.00	+0″.00	+0″.00	−0″.00	0
1	−0.04	+0.15	+0.15	−0.04	1
3	−0.14	+0.38	+0.38	−0.14	3
5	−0.23	+0.55	+0.55	−0.23	5
10	−0.37	+0.80	+0.80	−0.37	10
15	−0.46	+0.98	+0.98	−0.46	15
20	−0.51	+1.10	+1.10	−0.51	20
25	−0.53	+1.17	+1.17	−0.53	25
30	−0.53	+1.16	+1.16	−0.53	30
35	−0.52	+1.08	+1.08	−0.52	35
40	−0.45	+0.93	+0.93	−0.45	40
45	−0.31	+0.75	+0.75	−0.31	45
50	−0.11	+0.60	+0.60	−0.11	50
55	+0.04	+0.45	+0.45	+0.04	55
60	+0.03	+0.33	+0.33	+0.03	60
65	−0.02	+0.21	+0.21	−0.02	65
70	−0.16	+0.15	+0.15	−0.16	70
75	−0.32	+0.13	+0.13	−0.32	75

OBSERVATIONS IN DECLINATION MADE DURING APRIL AND MAY, 1887.

These observations like those printed in Chapter V, were made on two classes of stars: (1) Stars of AUWER's Fundamental Catalogue: (2) Stars of the Refraction List. No change in the methods of observation or reduction have been made and no corrections for flexure or division error have been applied. The number of observations is 369 which, with those before printed in this volume, make a total of 988 observations in declination made and reduced, from November, 1886 to May, 1887, by Mr. UPDEGRAFF and Miss LAMB.

30 H *Camelopardalis.*

1887.						
April 18	10	17	14	+83	7	57.3 W
25						57.7 W
30						58.0 W
May 3						59.2 E
6						58.0 E
7						59.1 E
9						57.2 E
10						58.5 W
12						58.5 W

LAC. α *Antliae.*

1887.						
April 18	10	21	59	−30	29	34.8 W
25						32.8 W
30						34.2 W
May 3						33.4 E
6						34.2 E
7						33.1 E
9						34.5 E
10						33.4 W

9 H *Draconis.*

1887.						
April 18	10	25	28	+76	17	41.1 W
25						41.2 W
30						41.4 W
May 3						41.5 E
6						41.6 E
7						42.5 E
9						40.9 E
10						41.2 W
12						40.9 W

37 *Ursae Majoris.*

1887.							
April	18	10	27	53	+57	39	51.7	W
	25						51.5	W
	30						50.8	W
May	3						52.9	E
	6						52.1	E
	7						52.7	E
	9						51.9	E
	10						51.8	W
	12						51.8	W

31 *Cephei*, S. P.

1887.							
April	18	22	32	59	+73	3	25.9	W
	25						23.9	W
	30						24.5	W
May	3						23.5	E
	6						23.3	E
	7						23.0	E
	9						24.8	E
	10						25.0	W

33 *Sextantis.*

1887.							
April	18	10	35	39	−1	8	53.4	W
	25						51.4	W
	30						52.2	W
May	3						52.9	E
	6						52.7	E
	7						53.0	E
	10						52.3	W
	12						51.6	W

42 *Leonis Minoris.*

1887.							
April	18	10	39	35	+31	16	37.8	W
	25						38.6	W
	30						37.7	W
May	3						37.5	E
	6						37.8	E
	7						37.3	E
	9						37.8	E
	10						37.5	W
	12						37.6	W

l Leonis.

1887.							
April	18	10	43	19	+11	8	33.4	W
	25						33.6	W
	30						33.8	W
May	3						33.3	E
	6						33.7	E
	7						33.8	E
	9						34.0	E
	10						33.7	W
	12						34.0	W

ι Cephei, S. P.

1887.							
April	18	22	45	40	+65	36	20.9	W
	25						21.9	W
	30						21.5	W
May	3						23.4	E
	6						21.3	E
	7						21.9	E
	9						22.3	E
	10						21.3	W
	12						20.7	W

Br. 1508.

1887.							
April	18	10	50	53	+78	22	30.9	W
	25						31.1	W
	30						30.1	W
May	3						32.9	E
	6						31.5	E
	7						30.9	E
	9						30.3	E
	10						31.3	W
	12						31.2	W

ψ Ursae Majoris.

1887.							
April	18	11	3	19	+45	6	41.6	W
	25						41.4	W
	30						42.6	W
May	3						41.9	E
	6						41.6	E
	7						41.2	E
	9						41.5	E
	10						41.6	W
	12						41.8	W

β Crateris.

1887.							
April	18	11	6	6	−22	12	32.4	W
	25						31.9	W
	30						32.3	W
May	3						33.8	E
	6						33.0	E
	7						33.2	E
	9						32.7	E
	10						32.4	W
	12						31.7	W

ϑ Leonis.

1887.							
April	18	11	8	19	+16	2	48.6	W
	25						49.3	W
	30						48.7	W
May	3						49.2	E
	6						48.8	E
	7						48.4	E
	9						48.7	E
	10						48.0	W
	12						49.0	W

δ Crateris.

1887.							
April	18	11	18	41	—14	10	2.7	W
	25						1.4	W
	30						1.6	W
May	3						3.3	E
	6						2.5	E
	7						2.6	E
	9						2.0	E
	10						1.8	W
	12						1.3	W

λ Draconis.

1887.							
April	18	11	24	41	+69	57	16.7	W
	25						16.8	W
	30						17.4	W
May	3						18.3	E
	6						17.3	E
	7						17.6	E
	9						17.5	E
	10						16.9	W
	12						16.9	W

ξ Hydrae.

1887.							
April	18	11	27	27	—31	18	58.5	W
	25						56.4	W
May	3						57.8	E
	6						56.6	E
	7						57.8	E
	9						57.2	E
	10						57.1	W
	12						56.1	W

υ Leonis.

1887.							
April	18	11	31	10	—0	11	60.4	W
	25						59.5	W
May	3						60.0	E
	6						59.1	E
	7						60.3	E
	9						60.5	E
	10						59.9	W
	12						59.3	W

γ Cephei, S. P.

1887.							
April	18	23	34	43	+77	0	5.2	W
	25						6.3	W
May	3						6.3	E
	6						6.2	E
	7						6.5	E
	9						6.0	E
	10						6.0	W
	12						5.6	W

χ Ursae Majoris.

1887.							
April	18	11	40	5	+48	24	21.8 W
	25						20.6 W
	30						22.0 W
May	3						23.4 E
	6						21.7 E
	7						20.9 E
	9						22.3 E
	10						21.6 W
	12						21.9 W

41 H. *Cephei, S. P.*

1887.							
April	18	23	42	31	+67	10	43.1 W
	25						44.5 W
	30						43.5 W
May	3						43.4 E
	6						44.2 E
	7						44.7 E
	9						43.4 E
	10						43.7 W
	12						44.7 W

β Virginis.

1887.							
April	18	11	44	49	+2	24	5.4 W
	25						5.8 W
	30						5.5 W
May	3						4.3 E
	6						4.1 E
	7						4.7 E
	9						4.7 E
	10						5.2 W
	12						5.6 W

β Hydrae.

1887.							
April	18	11	47	7	−33	16	45.7 W
	25						45.8 W
May	3						48.2 E
	6						46.3 E
	7						46.5 E
	9						46.5 E
	10						45.8 W
	12						46.0 W

o Virginis.

1887.							
April	18	11	59	27	+9	21	37.4 W
	25						37.5 W
	30						37.5 W
May	3						36.6 E
	6						37.3 E
	7						36.5 E
	9						37.7 E
	10						36.5 W
	12						37.7 W

ε Corvi.

1887.							
April	18	12	4	19	—21	59	28.9	W
	25						28.8	W
	30						28.7	W
May	3						28.6	E
	6						28.9	E
	7						28.4	E
	9						28.5	E
	10						28.7	W
	12						27.9	W

4 H. *Draconis.*

1887.							
April	18	12	6	54	+78	14	40.6	W
	25						39.0	W
	30						39.6	W
May	3						41.0	E
	6						39.5	E
	7						40.2	E
	9						39.8	E
	10						40.1	W
	12						39.9	W

δ Ursae Majoris.

1887.							
April	18	12	9	50	+57	39	39.1	W
	25						37.7	W
	30						38.5	W
May	3						39.3	E
	6						38.0	E
	7						38.5	E
	9						38.7	E
	10						38.2	W
	12						38.5	W

η Virginis.

1887.							
April	18	12	14	7	—0	2	20.1	W
	25						19.1	W
	30						20.7	W
May	3						19.0	E
	6						19.9	E
	7						20.0	E
	9						20.9	E
	10						20.0	W
	12						19.9	W

δ Corvi.

1887.							
April	18	12	24	1	—15	57	11.8	W
	25						10.7	W
	30						12.0	W
May	3						9.4	E
	6						10.3	E
	7						10.8	E
	9						10.7	E
	10						10.8	W
	12						10.7	W

24 *Comae seq.*

1887.						
April 18	12	29	28	+18	59	56.6	W
25						57.0	W
30						56.6	W
May 3						56.4	E
6						57.0	E
7						57.0	E
9						56.7	E
10						57.4	W
12						56.4	W

B. A. C. 4253.

1887.						
April 18	12	31	41	—26	30	50.1	W
25						49.4	W
30						51.3	W
May 3						51.4	E
6						50.6	E
7						51.5	E
9						50.6	E
10						49.5	W
12						50.5	W

γ *Virginis* (S. star)

1887.						
April 18	12	35	56	—0	49	49.4	W

γ *Virginis med.*

1887.						
April 25	12	35	56	—0	49	47.0	W
30						47.7	W
May 3						47.0	E
6						46.7	E
7						46.5	E
9						47.2	E
10						45.9	W
12						46.5	W

21 *Cassiopeiae*, S. P.

1887.						
April 18	0	38	12	+74	23	12.0	W
25						12.8	W
30						12.2	W
May 3						13.2	E
6						11.5	E
7						12.3	E
9						11.3	E
10						12.3	W
12						12.0	W

γ Cassiopeiae, S. P.

1887.							
April	18	0	49	54	+60	6	17.0 W
	25						15.2 W
May	3						14.4 E
	6						16.7 E
	7						14.8 E
	9						16.2 E
	10						15.1 W
	12						15.6 W

8 *Draconis*.

1887.							
April	18	12	50	59	+66	8	7.0 W
	25						6.2 W
	30						6.2 W
May	3						7.6 E
	6						5.9 E
	7						6.7 E
	9						6.5 E
	10						6.1 W
	12						6.7 W

43 H. *Cephei*, S. P.

1887.							
April	18	0	53	27	+85	39	0.8 W
	25						0.7 W
	30						0.0 W
May	3						0.9 E
	6						0.7 E
	7						0.8 E
	9						0.6 E
	10						0.6 W
	12						0.0 W

ε Virginis.

1887.							
April	18	12	56	33	+11	33	58.5 W
	25						59.8 W
	30						58.9 W
May	3						58.4 E
	6						59.3 E
	7						59.2 E
	9						59.7 E
	10						59.5 W
	12						59.4 W

ζ Virginis.

1887.							
April	18	13	4	6	− 4	56	8.8 W
	25						8.7 W
	30						8.0 W
May	3						9.6 E
	6						7.9 E
	7						7.9 E
	9						7.9 E
	10						7.8 W
	12						8.0 W

43 *Comae.*

1887.							
April 18	13	6	36	+28	27	3.9	W
25						3.3	W
30						3.6	W
May 3						3.0	E
6						4.1	E
7						3.7	E
9						4.2	E
10						3.2	W
12						3.9	W

γ Hydrae.

1887.							
April 18	13	12	47	−22	34	31.1	W
25						30.2	W
30						30.9	W
May 3						32.9	E
6						30.0	E
7						31.2	E
9						30.6	E
10						29.7	W
12						31.1	W

Polaris, S. P.

1887.							
April 18	1	17	23	+88	42	21.0	W
25						22.1	W
30						20.3	W
May 3						20.6	E
6						21.9	E
7						21.0	E
9						21.3	E
10						21.0	W
12						21.7	W

α Virginis.

1887.							
April 18	13	19	14	−10	34	17.5	W
25						17.5	W
30						16.9	W
May 3						16.6	E
6						16.2	E
7						17.1	E
9						16.3	E
10						17.6	W
12						17.9	W

Gr. 2001.

1887.							
April 18	13	23	15	+72	58	42.8	W
25						41.9	W
30						43 6	W
May 3						43.2	E
6						42.9	E
7						43.3	E
9						43.0	E
10						42.5	W
12						42.8	W

ADDENDUM TO VOLUME IV.

Page 8*, insert:

POSITION OF THE CIRCLE.

The circle was West:

From 1885, Oct. 24, to 1885, Nov. 15.
Dec. 18, Dec. 19.

The circle was East:

From 1885, Nov. 15, to 1885, Dec. 18.
Dec. 19.

ERRATA IN VOLUME V.

Page 40. Heading of column 11, for 261° 80′ read 261° 28′.
65. Last line, for 37″.00 read 37″.09.
84. First line, insert β before Fornacis.
123. Fifth column, for 1865.0 read 1875.0.
134. Fifth column, for 1875.9 read 1875.0.
151. Last line, first column, read ζ^1 Geminorum; fourth column insert +.
168. Fifth column, for 1875.9 read 1875.0.
213. First line, fourth column, insert +; sixth column, insert —.
216. Second line, fourth column, insert +.
224. First line, fourth column, insert +; sixth column, insert —.
241. Nov. 28, in column "Rain or melted snow" 0.26 is melted snow
243. Column "Rain or melted snow," the numbers given are for *melted snow* on the following dates: Dec. 14th, 17th, 19th 25th, 26th, 29th and 31st.